The Chemical Age

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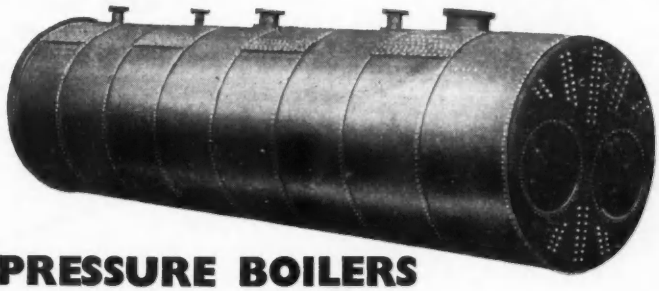
STORAGE TANKS



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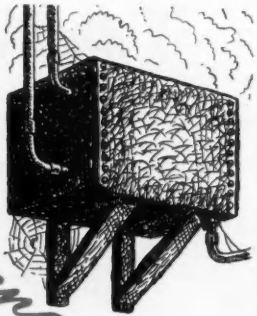

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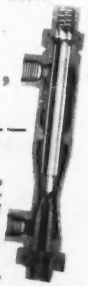

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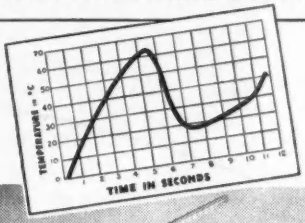

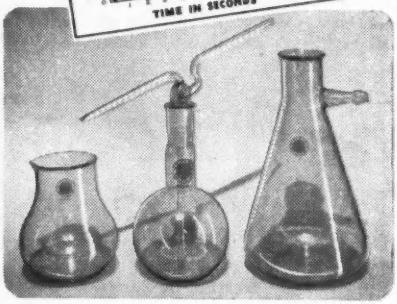

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Producers and Politicians

THERE was a time, comfortably within the memory range of most of us, when politics and industry occupied each its own well-defined sphere and when devotion to one did not necessarily involve any serious interest in the other. It is evident now that all that belongs to the past and that anyone today who makes chemicals or steel, refines sugar or fabricates one or other of the myriad goods for which raw materials are allocated or end products officially rationed will be brought into so intimate a contact—or collision—with the Administration that non-partisanship becomes an impossibility. That states the situation at its lowest level. If the reactions between industrialists and politicians meant no more than the addition of a few more Board of Trade and equivalent forms to fill, many in industry would still preserve the neutrality, in their commercial capacities. That philosophy has served very well and long a class which was satisfied that its purpose in life was to make goods and profits—not to make or unmake politicians.

The challenge which has robbed a large section of producers in this country of their status as neutrals in politics is one which has sought to represent profit making as disreputable, and seems bent on withdrawing in widening fields of industry the right to make goods at all. The victim who failed to show resentment of a direct attack of the latter kind would need to be pusillanimous beyond belief, certainly not of the kind which successfully directs large industries through times of uncommon risk and difficulty.

Those are some of more obvious reasons for the regrettable fact that politics in one form or another receives far more attention than ever before in all the familiar publications put out by commercial and industrial groups, company chairmen and federations, and has given rise to a revival of the old art of pamphleteering. The growing number of speakers and writers inside industry who are taking to this unfamiliar line of country cannot be blamed for this diversion, notwithstanding the expenditure of effort which is necessarily involved in ways which produce nothing tangible, much less anything that might reduce our dollar shortage. The cobbler, in this instance, would very contentedly have stuck to his last but for the imminent prospect that the last itself would be compulsorily acquired or rendered unrecognisable if he did not busy himself in its defence.

An arresting result of all such alarms has been the exceptional increase in

On Other Pages

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the past week or so of the number of organisations which have been provoked by signs of mismanagement of national affairs closely concerning them to appeal to public opinion in terms more vigorous than they have used before. The Federation of British Industries and the National Union of Manufacturers, both of which have a considerable support from the larger chemical undertakings, have shown that they can be most effective propagandists when need is as urgent as it appears now. The NUM is all the better equipped to make national appeals, not wholly to manufacturers, by having as its president a politician, and one with a special gift for the trenchant presentation of the case for the "industrial opposition." Sir Patrick Hannon last week told 600 manufacturers attending the annual general meeting of the union:—

"The stark fact is that industry now has to shoulder the whole burden of extricating Britain from her serious economic difficulties without the encouragement and assistance which it might rightly expect to help it in its colossal task. I should like to make it clear that by industry I mean every living soul engaged in it in whatever capacity. Therefore, we who are responsible for the direction of industry have a clear and unchallengeable right to a voice in industrial affairs. Industry must demand that the Government cease their wasteful and dangerous experiment of trying to make the harsh and unyielding facts of our economic life fit narrow, sectional political theories." Industry, he added, had been far too complacent in its law-abiding compliance with edicts and directions with which they profoundly disagreed. Briefly, he said, the situation was this:—

"Industry has become weary of two things. First, it is no longer prepared to accept, as only it can, the full weight of responsibility for our industrial recovery without having some substantial share in deciding the conditions under which it shall operate. Second, it is equally weary of mere exhortation, without constructive suggestion and action, as well as incentive, to enable it to make its maximum contribution to the national well-being."

Sir Patrick Hannon, the Tory member for Moseley, Birmingham, is doubtless not altogether a disinterested witness. Yet it is scarcely a coincidence that many shades of opinion in industry are saying the same thing with equal emphasis.

Notes and Comments

Petroleum Possibilities

THE arresting view that Great Britain is capable of becoming a serious rival in the world markets for petroleum outside the U.S.A. is being advanced in Washington by no less an authority than the American National Petroleum Council. Exaggerated as that may appear in the light of our own modest estimates of supplies of British petroleum products in the next few years, this estimate of the situation is supported by some relevant and—from our point of view—heartening facts. As long ago as June last year, 40 per cent of world reserves of crude oil were stated by the Petroleum Information Bureau to be in the Middle East. "Unless a way can be found through agreement with the British Government of converting enough sterling into dollars to lower production costs, American overseas producers may have to curtail operations drastically," forecasts the *New York Times*. The view is, of course, by no means unanimous. Despite the large petroleum projects and new plant being developed here, the yield from these cannot, according to the view expressed in the *Chemical and Engineering News* (27, 2982), be treated as a net reduction of this country's dollar deficit. The new products will not all take the place of finished solvents now imported for dollars, and there is a dollar element in the cost of raw materials. Another aspect of the dollar element was the ECA grant, just announced, of $9 million for U.S. oil plant for Grangemouth.

"Rationalisation"

AWARENESS by those who are putting into effect the policy of the Anglo-American Productivity Council that little is to be gained and much may be lost by undiscriminating imitation of U.S. practices has been a reassuring feature of the first of the reports—on iron and steel—and is apparent again in the productivity report, "Simplification in Industry." The latter, which the council has distributed this week, records the findings and some practical comments of a group of six—manufacturers and representatives of the British Standards Institution, the Federation of British Industries and the Ministry of Supply standardisation committee—which has intimately studied, here and in America, the factors which have made possible the classical examples of mass-production there. Results of intense specialisation and long runs, not merely in engineering products but in such industries as aluminium extruding, steel, and paint, varnish and lacquer, are shown to have brought very large savings both to the industries and to vast numbers of American consumers. The case for adoption of identical policies here is weakened, as the report evidently recognises, by the fact, among others, that the U.S.A. provides most of its own markets, and the overseas buyers, taking little more than 5 per cent of total production, are mostly educated to like the standard American product. This report does, however, leave no doubt in the mind that the extremely keen prices which U.S. industries have generally offered since the war owes as much to the practice of concentrating on narrow product ranges as to anything else. The need to combine a big increase of U.K. production with the best profit margin that can be secured gives this report an unmistakeable topical interest, regardless of some inevitable objections to borrowing the customs of a very different economy.

Know How

ONE of the good principles noticed in this report, whose adoption here could bring rewards to outweigh the conventional objections, is the widespread American custom of what used to be dubbed "telling the world." This productivity group was satisfied that "generally, manufacturers in the U.S.A. are willing to have their work

and its results widely publicised. This in itself is deemed to be an important factor in the development of high productivity and low cost." That engaging habit—which is, of course, not quite as devoid of reserves as some of the literature may suggest—receives testimonials every week in the U.S. technical Press in the form of commercial and technical explanations by principals, framed in more intimate terms than even shareholders here are privileged to hear. In that respect American industries have shed one of the shibboleths which some here tend still to preserve, illogically, with almost religious zeal.

Commonsense and Chemistry

THE troubles in which a general purpose Government department is almost bound to become involved when it deals with a subject which is peculiarly within the sphere of the analytical chemist have been exemplified by the amendment of the Motor Spirit (Regulation) Act, 1948. The object of that is, broadly, to establish that in legal parlance, at any rate, "diphenylamine" shall include not only the parent chemical but also compounds "of the same basic structure." The question of the nuclear-substituted diphenylamines being indistinguishable from diphenylamine itself would appear to be as irrelevant as most of the other contributions in the House of Commons to this chemical debate. Commonsense might well have compensated for the absence of chemical knowledge. No one seems to have questioned the probability of anyone deliberately doping his motor fuel with one of the other comparatively rare compounds analytically resembling diphenylamine—in order, presumably, to render himself liable to prosecution.

Conspirators' Day

AS if to rebut the criticism that the Ministry of Supply departments concerned with atomic energy have robbed the R.N. of its ancient distinction as "the silent Service," the authorities responsible for the great enterprise in Cumberland—the Windscale Works, Sellafield, which is reported to have been out of bounds to all but a chosen few since work began there—are going to a good deal of trouble to dispel the "top secret" aura which has grown up there. They are very busy just now putting finishing touches to a local atomic energy exhibition—but not, however, within the forbidden territory. This representation of some of the practical possibilities of nuclear physics has been set up in the innocuous surroundings of the Drill Hall, Whitehaven. "The object of the exhibition," says a note from the Ministry, "is to give the people of Cumberland the opportunity of learning something about the work of the great establishment which is being constructed in their midst and to understand something of the aims of Government atomic research." The faintly sinister flavour which seems—quite illogically—to cling to that bidding to a housewarming is not relieved by the day chosen. The exhibition opens to the public on November the Fifth.

Atomic Deadlock

THE moral responsibility of Britain to take the lead in utilising atomic science for good social purposes is the theme of an article by A. Litherland in the October issue of *Atomic Scientists' News*, journal of the Atomic Scientists' Association. Recalling that more than half the world's population is short of the necessities of life, the author urges acceptance of Lord Boyd Orr's plea—that this problem should be attacked immediately, "with the same drive and determination that we put into the horrid business of war." This would demand all available resources for a long period of years.

The struggle between East and West for armed predominance, he was convinced, served only to create an increasingly dangerous situation, and stock-piling of atomic weapons was capable of provoking an attack.

"Friendship and understanding are impossible across a barrier of competitive power, for you cannot shake hands with your left hand while you hold out an atom bomb in your right," Mr. Litherland maintains. There was a simple choice: power politics or world prosperity. The world could not afford both.

Neglected Chemical Sources

Failure to Convert Britain's Potential Raw Materials

WITH a dollar crisis threatening the livelihood of the whole nation, the need for making the best possible use of British raw materials in industry, rather than import them from dollar or hard currency countries, has become a matter of vital importance. This was the theme of a talk given by Dr. Jan F. Straatman to members of the Manchester Literary and Philosophical Society (Chemical Section) last week (October 26).

In an interview with Dr. Straatman after the meeting, THE CHEMICAL AGE was given a number of interesting indications of ways by which British chemical industry could save dollars, using available British raw materials.

Reducing Supplies

"We have all heard," said Dr. Straatman, "that imports from dollar or dollar-equivalent countries are to be cut from $1600 million to $1200 million—a cut of 25 per cent—and, as foodstuffs cannot be cut too much, a lot will have to be cut from raw materials. The question of British raw materials for British chemical industries is, therefore, growing in importance. We have all seen it coming a long time and we need have no doubt that the subject has been considered in high quarters for a long time."

Dr. Straatman, who is a consultant on industrial matters to a number of foreign Governments, went on to give figures of British raw material production compared with Continental countries, starting with the plastics group—phenoplasts, aminoplasts, vinylic, cellulosic and the others.

"For vinylic plastics the position in this country is very good," he said, "because all the raw materials are British and in 1947 Britain produced 6500 tons of vinylic plastics and expects to produce by 1952/53, 33,500 tons." The figures quoted were the official OEEC totals, he added.

"If we compare this with the whole of Western European production we see that in 1947 Britain produced 32.6 per cent of the vinylic plastics of Western Europe and by 1952/53 she will produce 33.4 per cent. Because all the materials are British, this country is holding its own and the same applies to aminoplasts—the British percentage in 1947 was 53 per cent and in 1952/53 will be 52.7 per cent—but if the raw material is not exclusively British the position is reversed, as in the case of phenoplasts," said Dr. Straatman.

"British production of phenoplasts in 1947 was 24,700 tons, which was 58 per cent of Western European production. By 1952/53 British production is expected to be 45,000 tons, only 43 per cent of Western European production. The cause of this is that British phenol production is too small.

Scarcity Forecast

"An immense amount of phenol has to be imported from the United States because we do not make synthetic phenol in this country in any appreciable quantities, and when imports have to be cut and production of phenoplasts has to go up, we shall see the very bitter consequences," he said.

The position in cellulosic plastics was equally bad, or worse. In 1047, British production was 27.3 per cent of Western European, but it would be dropping to 18.2 per cent in 1952/53. "Cellulose is one of the things this country practically does not produce, and important branches of the chemical industry have to use it in steadily increasing quantities," said Dr. Straatman.

"Before leaving the subject of plastics, let us look at the fifth group, among which is polythene. There again, British production was 41.9 per cent in 1947 and the expectation is that it will stay at 41.2 per cent in 1952/53," he added.

Straw Disregarded

Cellulose, however, was one of the "sore points." Continental countries were manufacturing cellulose for plastics, rayon production, for viscose, and for paper, in very large quantities from wood, beech wood especially, and from straw. "I should like to draw attention to the most remarkable position of straw. The British crop, as a rule, is about two-and-a-half times as much as the crop in Holland. At the moment, Holland uses about 550,000 tons of straw for chemical purposes—for straw board, paper, viscose and plastics; the consumption of straw in Britain for these purposes at the moment is 78,000 tons. And the remarkable thing about it is that the production of cellulose from straw in this country is going down and down."

Dr. Straatman said that during the war

(before 1941) there was practically no consumption of straw for chemical purposes, but in 1941, because esparto could no longer be imported, straw consumption started to boom; the peak was reached in 1945 when straw consumption was nearly 350,000 tons—still only 60 per cent of what Holland uses today. But now straw use had gone down to 78,000 tons and Britain was again importing more and more esparto. Esparto imports, in 1939 260,000 tons, had now reached 390,000 tons.

Neglected Cellulose

"Here is something remarkable," Dr. Straatman observed. "We have seen in plastics the very strong position which this country can have if it utilises British raw materials as much as possible. In straw we have got the raw material, the processes are available, and yet this country does not manufacture cellulose from this raw material!"

Dr. Straatman went on to explain how similar factors applied to rayon. "Viscose and cellulose are the bulk rayon exports—exports of rayon are about 140 per cent above pre-war, although cellulose has to be imported. If imports from dollar areas have to be cut and cellulose comes practically solely from dollar areas, that very big field of exports of rayon will feel the pinch, or else we will have to feel the pinch—in clothing. Even for rayon it is possible to manufacture the needed cellulose from home raw materials.

Meanwhile, the big Dutch rayon combine, A.K.U., had built a large factory to manufacture from straw a type of cellulose absolutely suitable to use as a raw material for viscose.

A Dollar Commodity

On the subject of sulphur, Dr. Straatman noted that of the three main sources, pyrites came from Spain and a few other countries—practically all requiring hard currency—sulphur was a dollar commodity and only spent oxide was a British raw material. Consumption of sulphur at the moment was 556,000 tons, and it was expected by 1952/53 it will have increased to 695,000 tons. That was to be compared with use by other countries—France 840,000 tons, West Germany 754,000 tons, Benelux countries 685,000—only 10,000 tons less than the United Kingdom, and Benelux has only 20 million population.

Some sulphur for sulphuric acid manufacture came from another source, mineral oil refining. By 1951, Holland would get from its mineral oil refining capacity 70,000 tons of sulphuric acid from the sulphur liberated during refining. At the rate mineral oil refining was being stimulated in this country, sulphur from that source might make a major contribution to the supply of home raw materials for the sulphuric acid industry.

One process which was finding more and more interest on the Continent (Holland, Belgium, France and Spain) related to anhydrite. "There are several BIOS and FIAT reports on the manufacture of sulphur and sulphuric acid using anhydrite as a raw material and, in the main, there are two different processes," said Dr. Straatman. "The first is by subjecting anhydrite to a reducing roasting with calcium sulphide as the resulting product. This can easily be decomposed with carbon dioxide to give hydrogen-sulphides, which again can easily be oxidised to sulphur. In the other series of processes the anhydrite mixed with clay is subjected to an oxidative roasting and gives, on the one hand, sulphur dioxide, which in turn gives sulphuric acid, and cement is obtained as a by-product."

Scope for Development

There was no doubt that for such simple chemical products as sulphuric acid and cement more use could be made of home raw materials, while greater production of sulphuric acid would give the country opportunity to manufacture more soluble phosphates. "As soluble phosphate we generally understand superphosphates, but several Continental manufacturers are devoting more and more attention to nitrophosphates," said Dr. Straatman.

Britain was far behind several Continental countries in the growth of its soluble phosphates industry. Production in this country just balanced consumption, and there was not an ounce for export, but even so, consumption per acre was only half what it was in Holland. There was here immense scope for superphosphate from home-produced sulphuric acid in agriculture.

Of nitrogenous fertilisers—a 100 per cent British raw material—Dr. Straatman recalled that, in the old days, chemists were wont to say you could not have fixed nitrogen unless you had cheap water power. Now for the manufacture of fixed nitrogen only coke oven batteries were needed.

"Britain produced just enough fixed nitrogen (1947 figure is 254,000 tons) to cover its own consumption. By 1952/53, production will be 287,500 tons and consumption, including colonial territories,

(*continued overleaf*)

will just be covered by that production. But if you look at consumption comparing Holland or Belgium with Britain, Holland uses three times the amount of nitrogenous fertiliser per acre—fertile as its soil is supposed to be.

"Air is a British raw material which you get for nothing and I cannot see why this country in the present circumstances should not use fixed nitrogen to improve yields in agriculture and to save dollars."

There were hardly any chemical products which could not be looked at from this angle, said Dr. Straatman. He suggested that a list should be compiled showing the hard currency content of the *ex*-factory price of chemical products—plastics, dyestuffs or sulphuric acids.

"I have compiled such lists for two Continental countries and they show amazing figures," he said. "You may say a certain product is a good one to stimulate for exports and when you look at the facts of the hard currency content you find it is not such a good product at all. It ought to be a crime to export cotton yarn, because the cost of the hard currency content is so extremely high.

"This is something which I should like more people to consider—the hard currency content of chemical production and ways and means to reduce that element, if it is possible, by other raw materials or other manufacturing processes.

"I know other raw materials and other manufacturing processes always mean a new building, new plant, and getting licences from a Government which is extremely careful in granting them. You have got to make a cast-iron case, to say that in a certain span of time you will produce the dollars. That is not a task for the Government, but a task for the manufacturer and the chemist.

"The chemist ought to figure out the hard currency content figure, calculate what he can do to lower it and so get his licence for building and extending his factory," Dr. Straatman concluded.

Continued Development of Natural Gas in France

NATURAL gas, occurring chiefly in the South-West of France, has during the last three years been an increasingly important factor in the French fuel economy. Interesting details on the exploitation of natural gas and the production of important derivatives are contained in the recently published report for 1948 of the Régie Autonome des Pétroles, a company which, since its formation by the French Government in 1938, has concentrated on the exploitation of the country's natural gas resources.

The quantity of natural gas exploited has risen from 9 million cu. m in 1942 to 250 million cu. m. in 1948, totals for the previous three years being 85, 110 and 174 million cu. m. respectively.

Derivatives obtained (in tons), and gross income derived (in million francs) for the years, 1945, '46, '47, and '48 are shown in the following table:—

Derivatives			
Propane/ Butane gas (tons)	Crude oil (tons)	Petrol (tons)	Gross Income (mill. francs)
696	740	3,700	213,2
733	120	5,289	400,5
1,441	626	7,331	748,5
2,396	1,620	2,824	777,7

A considerably increased quantity of natural gas is expected to be exploited this year. A number of up-to-date plants have been introduced in recent years at Saint-Marcet, Peyrouzet and Boussens. The most modern of these is probably that of the Usine de Dégazolinage de Boussens, equipped with U.S. machinery and apparatus, which has an annual capacity of about 1.2 million cu. m. of gas per day.

Distribution of the purified natural gas takes place through a network of pipelines having a total length of 527 km. It connects the plant at Peyrouzet with such important towns as Toulouse, Tarbes, Pau and Agen.

Openings for Executive Staff

A STATEMENT issued last week by the Ministry of Labour and National Service shows, for a large selection of managerial or executive posts, vacancies on the records of Appointments Offices on September 12.

Of the 48 professional categories listed it is significant that in only 13 of these, of which "chemicals manufacture and analysis" is one, are there more vacancies than registrants seeking employment.

The Ministry states that the main reasons for the co-existence of vacancies and available applicants in the same occupational group are that frequently applicants do not have the qualifications for which employers are looking. For the 82 openings for pharmacists the Ministry has but four registrants.

MORE DUTCH NITROGEN

Possible Export Surplus

OUTPUT of hydrogen by the Dutch State mines of Ijmuiden/Lutterade has lately been much increased while another nitric acid factory will soon be completed. Along with the Cie. Néerlandaise de l'Azote of Sluiskil and the State factory of Geleen they expect shortly to be able to increase the production of nitrogenous fertilisers on a scale to satisfy the rapidly mounting requirements (at present 125,000 tons p.a., as compared with 100,000 tons pre-war) and to dispose of a surplus for export.

The generators for the new conversion installation of Lutterade were provided by a British firm.

Although the Dutch superphosphate firms are reported to be working at full capacity it may not be possible to meet all home demands for the time being as superphosphate is an important item in trade with foreign countries.

Consultations between Belgium and Holland have been in progress to co-ordinate policies between the two countries for handling quinine salts of the Congo and Indonesia. No results have so far been made known.

Nylon in Holland

THE Algemene Kunstzijde Unie, the Haarlem rayon producer, has acquired the patent rights for the production of nylon from the E. I. Du Pont de Nemours. Owing to the elaborate character of the technique and especially the cost of installation, the A.K.U. will start with a pilot plant, and final output later is not expected to reach the current scale of production by I.C.I., Ltd., and Courtaulds. Some competition with the output from Pontypool in the European markets will, however, be offered. The A.K.U. is still experimenting, in conjunction with the Dutch section of the Royal Dutch/Shell (Bataafsche Petroleum Mij.), with a "fully synthetic" fibre of its own. It is believed to be a variation of polyvinyl chloride.

Colorimetric Determination of Bismuth

The review of this work (THE CHEMICAL AGE, *61*, 533) omitted the attribution—Yu. Yu. Lur'e and L. B. Guizburg (Zavodskaya Laboratoriya, 1949, *15*, *21*, *30*). The reference, A. I. Korkorin and N. G. Dermanova, was to the earlier work affecting the same subject.

MODERN INK PRODUCTION

Elaborate Plant and Instruments

SOME 40 members of the London Section of the Oil and Colour Chemists' Association recently visited the new printing ink factory of B. Winstone & Sons, Ltd., at Harefield. They were received by the works director, Dr. F. W. Stoyle, and conducted round the laboratories and works by him and by Dr. R. F. Bowles (chief chemist) and Mr. H. H. Stewart (works manager).

In the testing laboratories the visitors saw the methods used for comparing raw materials and finished products with standards, and in the research laboratories, where rheological problems especially are investigated, apparatus of particular interest included a cathode-ray oscillograph, several rotating viscometers, one of which was used for Dr. Bowles's empirical flow test, and a photo-electric reflectance meter.

Among the advanced equipment seen in the works were ball mills up to 500 gall. capacity and a battery of large roll mills, a works control room where inks are tested by scrapes, prints and fineness gauges; and a varnish house with kettles capable of heating 1½ tons of oil. Not the least impressive characteristic, common to all departments, was the scrupulous cleanliness.

Plastics Symposium

OBSERVING that chemists associated with plastics and polymer in Great Britain have for many years had no opportunity of meeting and discussing the recent advances of polymer science and their practical effects, the Plastics and Polymer Group of the Society of Chemical Industry has consequently decided to hold a three-day symposium in London in September 1950 under the title "Polymer Chemistry as Applied to Plastics."

It is intended as far as possible that the contributions shall be planned to bridge the gap between those engaged in theoretical studies and the industrial applications. Further information about the symposium will be published later. The honorary secretary for the symposium is Dr. N. J. L. Megson, Advisory Service on Plastics and Rubber, Ministry of Supply, R.716, Shell Mex House, London, W.C.2.

Aluminium Expansion

British Aluminium Co., Ltd., is extending its works premises at Swansea.

THE LARGEST CATALYTIC OIL CRACKER

Important Operating Economies in New U.S. Unit

MARKING the last step in the programme to effect a multi-million dollar expansion of its oil refinery facilities in two years, the Esso Standard Oil Company has formally dedicated its newly completed 41,000-barrels-per-day fluid catalytic cracking oil unit at Linden, New Jersey. It is said to be the largest in the world and to embody the most advanced principles in oil technology.

The objective of most of the modifications in the new plant has been to reduce to the minimum residual products and increase the yield of gasoline, heating oil, etc.

The new facilities include:

1. A vacuum pipestill (49,000 barrels per day), the largest in the world, which will make possible substantial increases in gasoline and heating oil yields. This unit receives residual oil and prepares from it a feed stock for the new catalytic cracking unit.

2. A fluid catalytic cracking unit and light ends recovery facilities (41,000 barrels a day). This single cracking unit will produce almost 1 million gal. of gasoline, 250,000 gal. of heating oil, and 270,000 gal. of other distillates daily. The catalyst used is a synthetic powdered clay consisting of silica, magnesium, and aluminium.

3. Additional steam and power generating equipment, new salt water pumping and distribution facilities, and new process and utility pipelines which are necessary to integrate the new process units into refinery operations.

Next to its size, its comparative simplicity is the predominant feature of the cracker. The cracking section consists of only two main vessels, the reactor and the regenerator, mounted side by side at about the same elevation on the main structure. Thus the overall height of the structure has been drastically reduced—165 ft., compared to 239 ft. for older units. This saved 800 tons of steel.

The catalyst capacity of the new cracking unit will be between 900 and 1000 tons. Catalyst will circulate at the rate of 56 tons a minute. One circulating line is almost 9 ft. in diameter and transports the catalyst at 1100°F.

Each gasoline gallon is calculated to require over three square miles of catalyst, surface worth $25; but since this fluidised catalyst is continuously reactivated the net catalyst cost per gallon of gasoline is less than 0.5 cent. The unit has more than 400 instruments located in one control room, so that it is possible for the entire unit to be run by only seven men.

The central unit of the oil cracker is the 35 ft. diameter reactor, wherein heavy gas oil is converted into lighter products in a turbulence of hot fluidised catalyst.

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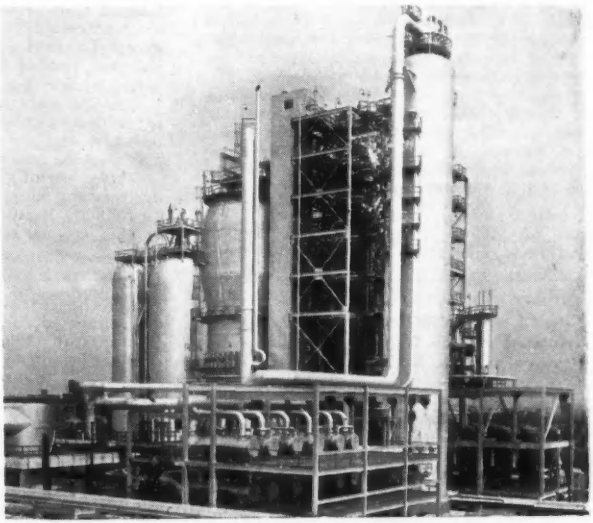

Vast catalyst store and regenerator (left) characterise the reactor unit

Petroleum Chemical Prospects: a U.S. Estimate

Were Early Forecasts Over Optimistic?

A USEFUL service was rendered the oil and chemical industries by Mr. J. Ostermeyer, president of the Shell Chemical Corporation, when he addressed the recent first Pan-American Engineering Congress in Rio de Janeiro. He sought to put into perspective, principally but not wholly from the U.S. standpoint, the rôle and prospects of chemicals made from petroleum.

The *Petroleum Press Service* presents his views with the comment that the great progress of the synthetic manufacture of chemicals from oil has caused this comparatively new branch to be represented as the oilman's short cut to success. Excessive optimism in this respect was dangerous, since the market for these products was much less reliable than that for ordinary oil products and was, moreover, susceptible to unforeseen competition.

One of the outstanding chemicals produced on a major scale from oil field natural gas is ammonia, and nearly all the huge ammonia manufacturing capacity, built during the war in the U.S.A., chiefly for the making of explosives, is now turning out fertilisers at a rate which is far above U.S. domestic needs. Thus, when the rest of the world has sufficiently recovered to make its own way, demand for these fertilisers is likely to decline, Mr. Ostermeyer foresaw. When this happens, the production of synthetic ammonia, from whatever source, is bound to suffer first, because it would have to face competition from ammonia produced as a by-product of the coking of coal.

Methyl alcohol is another important oil field product and most methyl alcohol plants can, like those for the manufacture of synthetic ammonia, be converted, at a moderate cost, to yield either product. These two products may thus be considered together and, according to Mr. Ostermeyer, it is a reasonable forecast that before long they will not call for more than 15,000 million cu. ft. of natural gas yearly, equivalent to about 0.3 per cent of total natural gas consumption in the U.S.A.

The main purpose of the Fischer-Tropsch plant now being built at Brownsville in South-West Texas by Carthage Hydrocol Inc., is to synthesise gasoline from natural gas; chemicals will also be produced, more or less incidentally. Consumption of the plant will be about one per cent of the annual total U.S. natural gas supply and about one-tenth of this will be attributable to the manufacture of chemicals.

There still appears to be some doubt, however, as to whether these can be separated and purified at competitive cost. The recovery of a pure chemical may easily be as expensive as its direct synthesis from other raw materials, including petroleum fractions other than natural gas.

Three important chemicals derived from the anticipated Fischer-Tropsch production at Brownsville, would together satisfy an appreciable percentage of total U.S. demand: ethyl alcohol roughly 3 per cent, n-butyl alcohol 3 per cent, and synthetic acetic acid 8 per cent.

The consumption in the U.S.A. of olefins for making chemicals (excluding gas components and synthetic rubber) is about 620,000 tons annually, produced both by cracking paraffins and by refinery cracking or reforming units. For every barrel of refinery light olefins for chemicals, 30 barrels are used for making refinery products.

LARGEST CATALYTIC OIL CRACKER

(*continued from previous page*)

Preheated gas oil feed, in a liquid state, is contacted with hot regenerated catalyst in the reactor inlet line. Immediately the oil is vaporised and the expanding vapours flow up into the reactor, carrying the catalyst with them. Within the reactor the oil vapours flow through a dense bed of catalyst where complete mixing and intimate contacting quickly completes the cracking reaction.

Before leaving the reactor, the cracked vapours pass through cyclone collectors, where the entrained particles of catalyst are separated and recovered. In a primary fractionator (130 ft. by 20 ft. diameter) product streams of gas, naphtha distillate, heating oil, light gas oil, and heavy gas oil are removed. The fractionator tower is actually taller than the cracking unit—a radical departure from early designs.

The regenerator is 55 ft. in diameter and is composed of a 20-ft. cylindrical section with a hemispherical head and cone bottom. Its design in these vast proportions was made possible by the inherent simplicity of the catalyst equipment.

A NEW INDUSTRIAL SOLVENT

Valuable Selective Action of Acetonitrile

From A SPECIAL CORRESPONDENT

ACETONITRILE, also commonly known as methyl cyanide or ethyle nitrile, is now assuming interest as a selective solvent or extraction medium for cellulose esters, celluloid, collodion, lacquers, alkaloids and fatty acids. A clear, colourless liquid with a characteristic ethereal odour, acetonitrile distills without decomposition. It forms constant boiling mixtures with most solvents: with water, its constant boiling mixture contains approximately 84 per cent acetonitrile and 16 per cent water, boiling at 76°C.

The new solvent is miscible with water, methyl and ethyl alcohol, carbon tetrachloride, acetamide, methyl and ethyl acetate, ethylene dichloride, ethyl ether, acetone, most unsaturated hydrocarbons, and many other compounds, but is immiscible with many saturated hydrocarbons, such as the paraffin series. It has a boiling point of 81.6°C.; freezing point —44°C., flash point 66°F., and vapour pressure (mm. mercury 20°C.) 50.2. Acetonitrile is stable and may be stored in steel containers. Due to its high vapour pressure, it will evaporate rapidly.

Toxicity

The quantitative toxicity of acetonitrile is close to that of acetic acid and, although it is not irritating to the skin, it is capable of penetrating it. Its effects, however, are not cumulative and it is reported that in the animal body the compound hydrolyses to form acetic acid and does not liberate hydrocyanic acid. The action of the vapours of this solvent differs from that of the chlorinated hydrocarbons and no damage to the internal organs seem to result, such as may be produced by carbon tetrachloride. Symptoms of acetonitrile poisoning resemble those of asphyxia and they disappear within a comparatively short time after removed from exposure.

A good deal of investigation has been carried out, particularly by the Niacet Chemicals Division of the United States Vanadium Corporation, on the general usefulness of acetonitrile as a selective solvent in industrial processes. It has been shown that this compound can be used for the following purposes:—

1. As a diluent or water extracting supplementary agent for the sulphonation of fatty acids, oils, resins and some other raw materials.
2. For the removal of resins, tars, phenolic substances, colouring matter, etc., in the refining of paraffin hydrocarbon oils.
3. For preparing neutral waxes by extraction of waxes with a high acid number.
4. For separating edible fish liver oils from fish livers.
5. For the separation of cellulose esters from cellulose ethers.
6. For the extraction of stearic acid from mixed fatty oils and fats, since most technical fats and oils, with the exception of castor oil, are not soluble, or only slightly soluble, in hot acetonitrile.
7. For the deacidification of many fatty oils. Fatty acids of linseed and cottonseed oil are easily soluble in hot acetonitrile, while the liquid fatty acid glycerides are not, or only very slightly soluble.

Selective Extraction

By exploiting the special characteristics —that acetonitrile will not dissolve most fatty acid glycerides and will dissolve fatty acids; will dissolve all cellulose esters but not cellulose ethers; dissolve Celluloid, colloidion and lacquers but no saturated hydrocarbons, fats, fatty oils and resins— the chemist is able to make use of this solvent for selective extraction where many other well known media have failed.

In analytical work, acetonitrile can be successfully employed in the separation of amber rosin and many fused copal types from venetian turpentine, Burgundy pitch, coumarone resins and rosin. It can also be utilised in the separation of cellulose esters from caoutchouc, gutta-percha or Balata.

$9 M. for Grangemouth Plant

APPROVAL has been given by ECA to a project to purchase machinery for the use of the petroleum chemicals plant to be established at Grangemouth, Scotland, at a cost of $9 million. This is the plant to be owned and operated by British Petroleum Chemicals, Ltd. (the Anglo-Iranian Oil Company and the Distillers Co., Ltd.). Dollars to cover the cost of machinery will be provided by ECA, British Petroleum Chemicals paying the full market price in sterling.

C

DEVELOPING TERPENE CHEMISTRY

Sir John Simonsen's Address to ACS

ONE of the major events at the 116th meeting of the American Chemical Society held at Atlantic City last month was the address to the Division of Organic Chemistry, by Sir John Simonsen, director of the Colonial Products Research Council of the Colonial Office, who was the first recipient of the Fritzche Award for research on essential oils.

Sir John's address is reported at some length in the *Chemical and Engineering News* (27, 2921) from which the following is extracted. He recalled his early association with W. H. Perkin and noted the development of terpene chemistry as he proceeded.

He became interested in essential oils, he said, as a chemical adviser to the Indian Munitions Board during World War I, observing difficulties with the easy oxidisability of Indian turpentine. In 1920 he began investigating the problem and was eventually led to the discovery that the main constituent was Δ^3-carene.

In this work he developed the idea that the carene and its 4 isomer would be found distributed widely in nature and that sylvestrene did not occur in pine oil from *Pinus sylvestrus* as postulated. This he later showed to be the case, thus removing the one standing exception to the isoprene rule.

Dr. Simonsen went on to describe a number of his adventures in terpene chemistry, which have done much to lay the foundation and develop the body of modern terpene chemistry. Some of the terpenes included thujene, curcumenes, di- and tri-ketone terpenes, dehydrogeranic acid, the first sesquiterpene ketones: the eremophilones, santalols, caryephyllenes, and laneol.

Dr. Simonsen commented with enthusiasm on developments in technique since he began his work and the consequent enhancement of possibilities for accurate and thorough work. However, he urged that the value of good chemical evidence should not be cast aside, as it is often important in substantiating conclusions drawn on the basis of physical measurements, such as ultraviolet absorption and infra-red and Raman spectra.

Dr. Simonsen also offered comments on the future of terpene chemistry. In answering his own question on the value of isolating constituents of essential oils and determining their structures, he said that in addition to the intellectual satisfaction of the research worker, there is a more fundamental aspect.

Such knowledge can prove of much value to the taxonomist, he contended, and he suggested that, until we know all the constituents in a growing plant, it will not be possible to have a sure scientific basis for agriculture, horticulture, and forestry.

Two great problems remain in terpenes: the mechanism of their formation and the part they play in plant metabolism. Dr. Simonsen expressed increasing optimism for the finding of answers to these questions.

African Scientific Research

THE African Regional Scientific Conference, which opened at Witwatersrand University, Johannesburg, last week, brought together almost every country having territorial interests in the African continent, to study African problems and the closer integration of scientific research among nations. Water conservation, exploitation of mineral wealth, and the improvement of health are among the principal subjects.

Observers from the United Nations Food and Agricultural Organisation, Unesco, WHO, the U.S. National Research Council and the Australian Council for Scientific and Industrial Research are participating.

Spain has not been invited.

Canadian Fellowships

CHEMISTRY will receive 18 out of approximately 31 post-doctorate fellowships for 1950-51 which are being offered by the National Research Council of Canada. Three will be granted for atomic energy research, and about 10 in physics.

The stipend is $2820 a year, tax free, and is supplemented by travel grants for successful candidates from abroad.

Appointments at the Atomic Energy Project, Chalk River, are restricted to Canadian citizens and British subjects, but applicants of all nationalities are invited for the divisions of chemistry and physics.

Applications should be made to the secretary, Laboratories Awards Committee, National Research Council, Ottawa.

Metallurgical Section

Published the first Saturday in the month

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5 November 1949

NEW TRENDS IN POWDER METALLURGY

Swiss and Czechoslovak Modifications

SEVERAL specifications relating to powder metallurgy have recently been announced in the Official Patents Journal, as open to public inspection. Three are from Switzerland (Primavesi) and three from Czechoslovakia (Skoda Works).

The first, amplifying Primavesi's numerous patents of a year or two ago, now claim improved methods both for electrolytic iron powder and for a chemical process from low-grade iron ores. The Skoda firm has introduced improved methods for preparing almost non-porous compacts, mainly through modified heat treatment.

In the English patent No. 32066/1948 (Conv. date 16.12.47), D. Primavesi, of Lugano, describes electrodeposition of readily pulverisable iron for purposes of powder metallurgy. Reference is made to a similar German specification No. 637,529 of Degussa (Deutsche Gold- u. Silberscheide Anstalt vorm, etc.) and to U.S. patents 2,099,873 and 2157. The German method referred to uses ferrous chloride electrolyte and an ammonium salt such as the chloride, and organic acids, at 90-100°C., a high current density, and *p*H of 6.5-7.2.

No Organic Acids

Using a similar electrolyte, with 50-100 g. iron per litre, together with ammonium chloride, it has been found, according to the present invention, that organic acids and compounds can be omitted. These latter introduce a certain amount of carbon into the electrolytic iron, thus reducing its magnetic values.

Current density used is 500-2000 amp./sq. m. Renewal of electrolyte is kept at a rate which excludes excessive heating and the temperature is maintained at about 40°C. normally, with *p*H of 3-6, so that iron waste material is dissolved. Insoluble graphite anodes are used, with iron or aluminium cathodes, which may be movable strip since the thickness of the iron deposit is very small. The diaphragm may be of glass wool or the like. Formation of chlorine gas at the anodes is said to be prevented by placing in the anode chamber, up to about 20 per cent of its capacity, waste iron or filings; there is some decrease in the bath voltage through removal of anodic chlorine—probably due to depolarisation.

When the iron deposit is about 1 mm. thick it is removed, ground (wet or dry—it is very friable) to any desired fineness to produce a material similar to carbonyl iron powder of particle size 1-5 mu. The product is tried with careful exclusion of oxygen, and then reduced for about two hours in hydrogen at 600-800°C.

Chemical Conversion

In the English patent 32363/1948 (Conv. date 16.12.47), Primavesi claims a method for production of metal powders—in this instance—iron powder, by chemical means—the conversion of oxides to chlorides by treatment with HCl, which is recovered and re-used.

Any raw material containing iron oxide, even of low grade, is ground and exposed to a stream of HCl gas at a temperature of not more than 950°C., resulting in the formation of ferrous or ferric chloride. Other metal chlorides formed are removed and, if desired, their respective metals can be recovered by re-distillation in HCl gas at temperatures below 850°C.

The purified iron chlorides are reduced in hydrogen at a temperature below the melting point of ferrous chloride (670°). Sponge iron formed thus is ground to any desired fineness in a mill, washed with distilled water, and dried. Prior to moulding it may be again reduced in hydrogen and re-ground. The residual gas after reduction—mainly hydrogen, with some HCl—is recovered and used.

Primavesi also claims—in English patent No. 32717/1948, conv. date 19.12.47—an improved method for producing hard sintered alloys of tensile strength exceeding 30 kg./mm² or 43,000 p.s.i.

Fabricated sintered metal powder parts

are being increasingly used for many important manufacturing purposes. It has been found, however, in the use of iron and steel, that a relatively low elongation is often a serious drawback: with a sintered iron product elongation is often less than half that of ordinary iron; and with steel-sintered parts it may be only about one-fourth.

It has been a practice to reduce the carbon content of steels and replace it with another element, such as copper. This element, in sintered steels, behaves differently from carbon. While in sintered steels an increase in carbon content leads to increased strength and to decrease in quality grade coefficient; iron-copper alloys differ in that, with little copper, they have a grade coefficient twice that of sintered steels of equal strength, the benefit increasing with copper content. Based on this is the claim now made for a sintered alloy capable of being hardened and tempered, consisting mainly of iron, and in which the carbon is replaced by copper, up to not more than 6 per cent.

Non-Porous Compacts

Further evidence of the post-war activity of the Skoda Works in powder metallurgy is represented by a claim to have a method of producing almost non-porous sintered hard metals. This is contained in their English patent No. 31804/1948 (conv. date 15.12.47).

Shaped components made of sintered hard metals with organic binders are usually pressed to shape, but there is little or no shrinkage in the first sintering; and only shaped parts machined from the pressings undergo, during second sintering, substantial shrinkage, of 20-25 per cent linear or 50-60 per cent by volume. Various attempts have been made to eliminate pores and produce more compact material, but these are mostly difficult, time-consuming, and ineffective. A better way, according to the present invention, is a substantial change in the first sintering operation.

The rods pressed out of hard metal are not sintered at 700-1000°C. until the first appearance of solidification; they are sintered at a higher temperature, but not so high as to cause substantial shrinkage. The required temperature can be determined from the equilibrium diagram of tungsten carbide and cobalt alloy, *e.g.*, that of S. Takeda, according to cobalt content. The melting point of cobalt is normally about 1250°C., but varies somewhat with tungsten carbide content and fineness. However, a temperature of 1150°C. should not be greatly exceeded.

The present method therefore consists chiefly in pre-sintering the pressed hard metal rods for half an hour at a temperature of about 1250°C. or, according to composition, at the temperature at which the bonding or additional metal just begins to melt (softening point). It is possible then either to produce in the usual way from such pre-sintered rods thin hard metal plates, or crush the rods mechanically, repeating this once or twice. Several favourable results are thus claimed.

If the pre-sintered hard metal is ground, the carbide grains are better enveloped by the soft metal, conferring improved non-porosity of finished product, and the hardness of the added metal (bond) is increased. If toughness, rather than hardness, is required, the heat treatment may be varied accordingly, *e.g.*, by slowly cooling to 1000-1250°C.

There is a certain similarity in the English patent No. 32319/1948 (Conv. date 16.12.47), for improved hard metal alloys. This, however, relates to mixed carbides, wherein (as before) the added bonding metal of relatively low melting point dissolves the carbide particles.

In the present instance it is stated that, for the individual carbides, the bonding metals are those which will at least partially dissolve the respective carbides, on sintering, and, on cooling, again eliminate them as far as possible.

Cobalt is used as additional metal for the carbides of tungsten, titanium, and zirconium; and nickel for those of molybdenum, tantalum, and niobium. The nickel exceeds the cobalt by 15-20 per cent. The carbides, together with associated addition metals, are subjected to intermediate grinding before final treatment.

The English patent No. 32713/1948 (Conv. date 17.12.47) of the Skoda Works relates to moulded bodies made of sintered hard metal. Sintered hard metals are distinguished by their high degree of hardness, almost approaching that of the diamond, but have relatively low strength and toughness. The ideal state for tools and other articles subjected to hard wear

(*continued at foot of following page*)

WIDENING WELDING TECHNIQUE

Rewarding Applications to Rolling Stock

THE many examples of modern applications of welding which had taken place to date, were the best augury for the growth of the method in the future, said Mr. O. V. S. Bulleid, president, at the opening meeting of the autumn session of the Institute of Welding, held in London on October 25.

The progress, he affirmed, had been helped by the efforts of the members of the institute, who, by keeping before engineers examples of welded construction, and by lectures, papers and books, had disseminated a knowledge of work done and of the possibilities. Thus had they broken down the inertia and fear of change of practice, which acted so perniciously against the progress of British engineering in many fields.

Welding offered an invaluable tool, especially to-day, when saving of weight was at last appreciated, and it was a craft which demanded a high standard of integrity. It behoved us to develop the training of men to provide the craftsmen needed for the further development of welding. We should not pretend that welding could be done by other than craftsmen, but should support the craftsmen using welding and they would give the loyal service needed.

In research they had every help from the British Welding Research Association and it was their duty to support it and to see that its research was devoted above all to the development of welding by simplifying and cheapening it. For example, continuous machine welding could be developed and, if costs were to be reduced, must be developed. The preparation of the work for welding was another source of cost requiring close attention if they were to reach the ideal of "cheaper than riveting."

The railways were a prominent field in which welding had been successfully applied. The gradual application of welding to rolling stock prepared the way to the latest innovation in rolling stock on the Southern Region of British Railways. The double-decker coaches would not have been a practical proposition were it not possible to fabricate the body frames, etc. Those trains, with no increase in weight, carried more passengers seated than the previous trains.

The "Leader" class of locomotive also was an excellent example of what could be done by fabrication by welding. The boiler was welded, as also were the main frames. The bogie, with its cylinders, frames, and stretchers, was welded into a monobloc structure.

The latest design of 16-ton railway wagon was 1 ton 7 cwt. lighter by the application of welding and flame cutting techniques to the frame, body, and details. An extremely valuable use of welding in the production of rolling stock details was obtained by welding together pieces which might be flame cut, drop stamped, or forged.

NON-POROUS COMPONENTS

(*continued from previous page*)

is an outer working edge or rim which is very hard, with an inner core which is very tough and not necessarily so hard. Various methods of producing hard surfaces are known, but suffer certain disadvantages.

In the present invention it is claimed that such defects are overcome by selecting the kind and proportions of added or bonding metal; it is implicit that any increase in strength and toughness is gained at some sacrifice of hardness. Thus, it has been found advantageous to produce a hard metal with a core containing more cobalt as bonding agent than the rim or outer zone in which the hard constituent is tungsten (wolfram) carbide or tungsten-titanium carbides.

With other carbides nickel may be used (see previous specification No. 32319/48). Thus the core may have 11-13 per cent cobalt and the rim only 5 per cent, so that the core may have strength and toughness double that of the rim.

The manufacture of plates or other moulded bodies of this type may be achieved in various ways. Thus, the powders of hard metals with different cobalt contents may be placed in layers in the press mould.

The hard metal (carbide) and added metal is then subjected to pressing and sintering. The finished body consists of zones distinguished by different cobalt contents. During sintering these zones tend to diffuse somewhat into each other, which is a further advantage. This method may be used also for large moulded hard metal bodies.

COLD WELDING ALUMINIUM

U.S. Adopts a U.K. Process

THE great practical value of a British innovation, recently patented, permitting satisfactory cold welding of aluminium, has found recognition in the U.S.A., where a company has been formed, the Koldweld Corporation, which has links with the Cornell-Dubilier Electric Corporation, to exploit the process. This was announced by Mr. W. Dubilier, founder and technical director of the latter company, on his return to the U.S.A. after consultations with the British originators and patentees of the present procedure, the General Electric Co., Ltd., of Kingsway, London.

Division of Royalties

The American company is about to stage a comprehensive demonstration of the new process, which is applicable to aluminium and comparable metals, the basic importance of which is that it accomplishes welding without electricity or applied heat. American rights were acquired by the Koldweld Corporation under an agreement providing for a division of the proceeds between the American and British firms.

The process, which has proved most readily applicable to aluminium and copper, said Mr. Dubilier, might revolutionise industrial and job welding in these fields. The tools required are inexpensive, and provide for the first time a means of fusing light or small parts by means of hand-operated devices, requiring no special skill. Fundamentally, the method consists of the application of moderate pressure with specially designed hand tools under controlled conditions.

Mr. Dubilier, an inventor with several hundred patents, mainly in the electrical field, to his credit, said he had considered himself " retired " when the British welding developments came to his attention.

To secure the widest possible use of the new process, he said, manufacturers would be licensed, paying fixed fees based on the value of products or parts produced. The Koldweld Corporation itself will do no manufacturing, confining its activities to licensing others to use the tool designs.

It is reported that both the Lockheed Aircraft Corporation, and the Piper Aircraft Company are among the first American aircraft companies to have undertaken tests of the new welding method as a means of eliminating much present welding and rivet work.

ADAPTABILITY OF STEEL

W. of Scotland Expert's Review

THE iron and steel trade was fully alive to the need for the application of science to industry, claimed Mr. W. Barr, in his presidential address to the West of Scotland Iron and Steel Institute in Glasgow on October 21. This was shown by post-war records of production and by the activities of the British Iron and Steel Research Association.

Development of new and better products was a feature of metallurgical research, which had a particular appeal at the moment because of the opportunity it provided for exploiting existing knowledge, of which there was a vast accumulation waiting to be turned to practical account. Mr. Barr outlined some of the work undertaken and the results obtained along these lines in the West of Scotland in recent years.

In spite of the remarkable increase in the production of alloy steels in the past few decades, ordinary mild steel still constituted the great bulk of production, he said. Troubles of a minor nature arising from cracking either in fabrication or service had occasionally been encountered but, generally, mild steel was regarded as having ample ductility for all practical purposes, and it was only with the advent of welding on a large scale that confidence in that respect had been shaken in some quarters.

Mild and Clad Steels

British failures in mild steel structures in this country had been relatively few. There had certainly been nothing of the catastrophic nature which had been experienced elsewhere—a tribute to British steel, design, and workmanship. Nevertheless, the occasion was not one for complacency, since the application of welding in British shipbuilding was being rapidly extended to larger vessels, incorporating plates of increasing thickness.

The spectacular progress accomplished in recent years in the chemical and oil industries owed a great deal to the availability at an economic price of structural materials possessing, in addition to adequate strength and ductility, the capacity for resisting the attack of highly corrosive substances. The relatively high cost of stainless steels had given rise to wide interest in chemically resistant clad steels, the main body of which consisted of the less expensive and more easily fabricated mild steel.

Fast Electrolytic Metal Polishing

Simplifying A Technical Process

A NEW instrument which holds promise of changing electrolytic metal polishing from a highly technical process to a method readily adaptable to workshop control was demonstrated in London last week.

The apparatus, known as the Disa-Electropol, is intended more particularly for the electrolytic polishing of metallurgical specimens which are to be subjected to microscopic examination.

Main features of the Disa-Electropol are its extreme simplicity, which enables untrained people to learn to use it in a very short time, and the speed with which the entire operation can be completed.

When dealing with samples of steel and iron the polishing process itself generally takes about 20 seconds and the entire cycle from the moment a specimen has been prepared by grinding a flat surface on it till the polish is complete, including after-etching, washing in alcohol, and drying, takes about 3 minutes.

On most steel samples the etching may be made electrolytically in continuance of the polishing, simply by turning a switch a few seconds before the polishing time is up.

In other cases a simple but ingenious device permits an electrolytic after-etching with other electrolytes without exchanging the liquid in the apparatus.

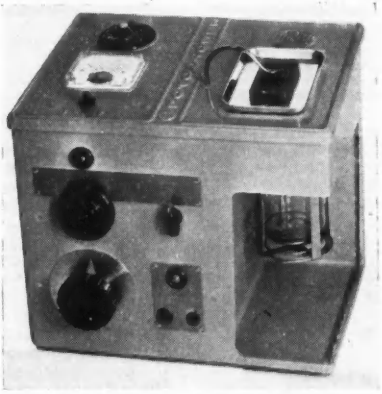
The specimen to be polished is kept in position by a clamp over a small plate which can be changed to vary the size of the surface requiring treatment. The electrolyte is held in a container and the liquid is pumped up so that it flows over the object, thus ensuring an even distribution and helping to keep it cool.

Thorough Trials

The Disa-Electropol, construction of which was suggested by E. Knuth-Winterfeldt, has been given thorough laboratory and practical working tests before being put on the market. It has been officially accepted as the standard means of electrolytic metal polishing at the Danish University, Copenhagen. It is being distributed in this country by Laboratory Equipment (London), Ltd.

An obvious impediment to wider industrial application of the instrument is the comparatively small areas (a maximum of about 100 sq. mm.) which can be polished. The instrument, at this stage of its development, is somewhat costly. That, however, may be changed when the apparatus becomes more generally used.

The Disa-Electropol has been publicly demonstrated in London and Sheffield.



[Courtesy, Laboratory Equipment (London), Ltd.

The Disa-Electropol for rapid production of polished metal surfaces for microscopic examination

Tackling the U.S.A. Markets

THE initiative of a private firm intended to assist the small exporter to tackle the American market was reflected at a reception in London this week, when Mr. A. N. C. Varley, director of C.P.V., Ltd., gave a talk on market prospects he had noted during a visit to the U.S.A. He suggested that, while many British firms could not hope to break in on the mass market, there were plenty of opportunities for a sectionalised trade opening. New York was not the United States and there was almost endless scope in Texas and the markets of the Middle West. A preliminary market research report, however, was essential.

America was a great country for factual information and the " higher-ups " of most big firms were more easily approachable than in this country, said Mr. Varley. Too little use was being made of the British Embassy, consulates and commercial attachés.

Greater Output of Non-Ferrous Metals

September Stocks Show Slight Reduction

CONSUMPTION of non-ferrous metals in the United Kingdom in September was marked by a general increase and, although production in most grades was higher, closing stocks at the end of the month showed a slight reduction all round.

Details of production, consumption, and stocks (set out below) are abstracted from the summary supplied by the British Bureau of Non-Ferrous Metal Statistics.

UNWROUGHT COPPER

	Long Tons Blister Copper	Long Tons Refined Copper
OPENING STOCKS:		
Govt. and consumers'	57,619	92,329
Imports	10,036	16,730
PRODUCTION:		
Primary	—	11,691
Secondary	2,165*	7,123
CONSUMPTION:		
Primary	11,827	29,509
Secondary	—	14,575
Exports	3,189†	26
CLOSING STOCKS:		
Govt. and consumers'	53,663	91,573

*Rough copper

† Includes 933 tons rough copper dispatched to Belgium and 2,256 tons rough copper to Germany for refining on toll.

GROSS OUTPUT OF MAIN COPPER, ALLOY AND PRODUCTS

Unalloyed copper products ...	...27,281 long tons
Alloyed copper products ...	...23,950 ,, ,,
Copper sulphate	... 3,320 ,, ,,

UNWROUGHT ZINC

	Long Tons Zinc in Concentrates (estimated gross Zinc content)	Long Tons Slab Zinc (all grades)
OPENING STOCKS:		
Govt. and consumers'	30,021	75,743
Imports	13,850	9,909
PRODUCTION:		
Virgin and remelted...	—	6,156
CONSUMPTION:		
Virgin (incl. debased)	7,632	18,447
Remelted and scrap...	—	7,734*
Exports and Re-exports	—	26
CLOSING STOCKS:		
Govt. and consumers'	36,239	73,862

*Includes small quantity of zinc in concentrates consumed directly for chemicals, etc.

LEAD

	Long Tons Lead in Concentrates	Imported Virgin Lead	English Refined	Lead Content of secondary Scrap and Residues
OPENING STOCKS:				
Govt. and consumers' ...	—	63,210	2,007	—
Other stocks...	31	—	—	—
IMPORTS ...	—	14,172	—	309
PRODUCTION ...	205	—	2,435	—
CONSUMPTION ...	227	17,389	2,539	10,890
Exports ...	—	38	—	—
CLOSING STOCKS:				
Govt. and consumers' ...	—	61,491	1,903	—
Other stocks...	9	—	—	—

TIN METAL

	Long Tons
GOVT. AND CONSUMERS' STOCKS (at end of period)	15,872
IMPORTS	24
PRODUCTION	2,122
CONSUMPTION	1,811
EXPORTS AND RE-EXPORTS	553

ANTIMONY

	Long Tons
TOTAL CONSUMPTION OF ANTIMONY METAL AND COMPOUNDS	397
TOTAL CONSUMPTION OF ANTIMONY IN SCRAP	395

CADMIUM

	Long Tons
TOTAL CONSUMPTION OF CADMIUM	45.95

Key Industry Duty Exemptions

THE Board of Trade has under consideration the renewal from January 1, 1950, to June 30, 1950, of the Exemptions from Key Industry Duty as set out in the various Safeguarding of Industries (Exemptions) Orders. In particular, the Board is considering the discontinuance of the exemption of the following chemicals:—

Acid dipropyl-malonic, acid filicic, allyl paracetaminophenol, amido-guanidine sulphate, butyl methyl adipate, cumenol (pseudo), methyl cyclchexanol methyl adipate, p-di-ethoxy ethenyl diphenyl amidine and its hydrochloride, elbon (cinnamoyl para-oxphenyl-urea), eukodal, kryofin, N- (oxy-aceto-mercuric-propyl)-ethylurethane, oxymethyl para-oxyphenyl benzlamine, methyl sulphate, a-napthyl isothiocyanate, nickel hydroxide, 4-oxy-3-ethylamino-phenyl arsenic acid N-methyl tetrahydropyridine B-carboxylic acid methyl ester, phenetidylphenacetin and its hydrochloride.

Any representations on the subject by individuals should be addressed to the Industries and Manufactures (General) Division, Board of Trade, Millbank, London, S.W.1, before December 3.

Indian Geological Survey

Search for oil and for a number of important minerals is to be continued by the Geological Survey for India, 1949-50. Copper deposits are to be investigated in the Darjeeling district of Sikkim, and a geophysical survey will be made of deposits in Khetri (Rajasthan) and Nellore district (Madras). There is to be detailed prospecting for lead in Tehri Garhwai and investigation of iron ore deposits in several provinces.

ELECTRO-CHEMICAL DEPOSITION

Well Co-ordinated Scottish Departments

THE Fescol process is a method of electro-chemical deposition which is suitable for restoring to size, or building up worn or undersized parts and providing them with a corrosion-free surface which is highly resistant to wear.

As its application is a cold process, the structure of the basis metal remains unchanged, and no distortion occurs. Deposited materials in common use are nickel, chromium, copper, and lead.

Intimate adhesion or interlocking to the basis metal is the keynote of the method. The deposit and base being united by zones of atomic attraction, any required thickness can be applied.

While the majority of work to be undertaken consists of depositing on external surfaces, internal work can be undertaken within certain limits.

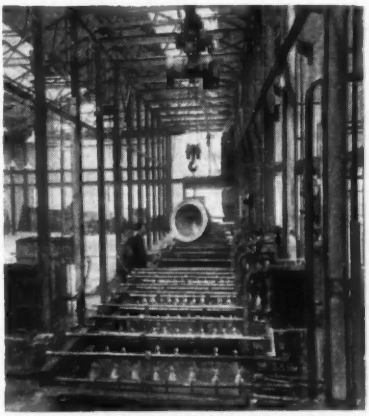
The method has been developed by Fescol, Ltd., whose latest development is the opening of a new works at Port Glasgow, covering an area of about 16,000 sq. ft.

The general arrangement there provides a nickel composition department situated on one side and the chromium department on the other. Ancillary departments such as materials, stores, inspection, polishing, etc., are situated in the centre, where they can serve either of the production sides with equal facility. There are separate goods entrances with adequate handling arrangements for incoming and outgoing components.

Easy Operation

The nickel depositing department comprises a battery of ferro-concrete vats, with acid-resisting linings, excavated to such a depth as to allow for maximum head room, while providing a convenient height for the operators. There is no staging, all work being carried out from floor level. The floor is laid with special acid-resisting material, and surface drains take care of the effluent.

A smaller battery of nickel vats is situated alongside the main line, to deal with lighter articles which do not require the service of an electric hoist. In this case the current is supplied from Westalite rectifiers situated close to the vats themselves, the group forming a complete entity with its own compressors, filters, air agitation, etc.



The range of heavy nickel depositing vats in operation at Port Glasgow

The chromium department, like its nickel counterpart, is in one line.

The deep vats are nearest to the entrance, and are contained in a concrete trench, lined with acid-resisting material, and suitably drained. Easy access to the trench is provided, and the tanks can be readily removed for repair and maintenance. Next to these are the smaller vats which sit in separate compartments, the outfall from which leads into a common drain.

Low tension current comes from Westalite rectifiers and each vat is self-contained so far as current supply is concerned. As these rectifiers can be located in close proximity to the vats, advantage has been taken of this to place the rectifiers between the wall and the drainage ditch, so utilising what would otherwise be waste space, while allowing for easy removal and maintenance of the rectifiers.

Voltage drop is avoided by the use of short bus-bars, an important consideration when dealing with low voltage current. Each vat has a self-contained fume-exhaust system, and thus, in the event of an interruption due to breakdown, only the unit concerned is affected. The fumes are taken through the wall in trunking and are discharged to atmosphere at high level, where they are dissipated.

CORROSION EFFECTS ON STEEL

Newer Methods of Estimation and Prevention

CORROSION resistance and corrosion fatigue of steel were the subjects of a number of authoritative papers, followed by very useful discussions, at a recent joint meeting in London of the Iron and Steel Institute and the British Iron and Steel Research Association. Mr. T. M. Herbert, chairman of the Corrosion Committee of the BISRA, presided.

During the morning session four papers concerned with atmospheric corrosion were discussed, all being presented by their authors. The first was "A simple form of accelerated atmospheric corrosion test," presented by Mr. R. St. J. Preston, of the Chemical Research Laboratory, Teddington.

Accelerators

Mr. Preston emphasised that this was not an accelerated weathering test, but one where the main agents of corrosion were produced in controlled conditions. He described how specimens are subjected to corrosion in a warm humid atmosphere containing sulphur dioxide.

The effects of temperature and concentration of sulphur dioxide on rates of corrosion of bare and phosphated steel, with and without paint coverings, had been examined, and it had been found that corrosion rates increased with rise in temperature and with increase in sulphur-dioxide concentration.

Pre-treatment by phosphating improved the corrosion resistance of painted steel, particularly when the paint coating was less than 0.5 mm. thick. A thick phosphate coating, which completely covered irregularities in the steel surface and therefore did not conduct electricity, showed a resistance in outdoor exposure tests much superior to that of bare steel.

Results obtained with this apparatus were far more representative of the behaviour of protective material in industrial atmosphere than were those given by the salt spray test.

In the discussion, Mr. S. C. Britton (Tin Research Institute) stated that, for those applying protective processes for use in industrial atmospheres, the test described would certainly be useful for checking the quality of material supplied or for the maintenance of standards on the production line. Quick results were essential and the test promised to give a reliable order of merit for similar processes.

Those who wished to choose a new method of protection and those developing new methods might not be so well suited since they wanted estimates of the useful lives of rather different materials. He was not convinced that the method as it stood could give even a reliable order of merit for dissimilar materials. He recalled tests made with Dr. U. R. Evans in which exposure of different metals over SO_2 solution failed to give orders of merit consistent with those obtained on atmospheric exposure.

Mr. Britton suggested that reliability in predicting the service behaviour of dissimilar materials could be improved, at some sacrifice of acceleration, by using lower concentrations of SO_2 and by introducing into the test periods of drying out of the samples and of washing down with water, both important features of normal corrosion.

Mr. T. Henry Turner (chief chemist and metallurgist, Railway Executive. E. & N.E. Regions) asked whether the test was limited to the standard 6 by 2 in. shape; users require to test irregular shapes such as nuts and bolts. If Mr. Preston's test could be developed for adoption as a British Standard test, that would be of real value to industry, but it seemed undesirable to have to miss out the features of the samples and of washing down with were experienced in industry.

Atmospheric Shield

Dr. Mayne, a member of Dr. Evans' team in Cambridge, raised the point that this test involved an important principle. Was one attempting to accelerate corrosion or to accelerate the breakdown of paint? Hudson and Banfield had shown how corrosion of a painted steel in a heavily industrial area such as Sheffield was not more rapid than elsewhere. It had been thought that the slow results from exposures in Sheffield had been possibly due to the fact that ultra-violet light was kept off the specimens by the atmospheric pollution and by accumulations of deposit. The effect of ultra-violet light had been confirmed by American work. He pointed out that this factor had been entirely neglected in this test.

Dr. Vernon, of the Chemical Research Laboratory, DSIR, said that accelerated tests at Teddington based on the use of SO_2, had accurately reproduced the well-

known curve showing the effect of copper content on corrosion rate, salt-spray tests had failed to reproduce this relationship.

Mr. Preston, replying, stressed the importance of controlling the SO_2 concentration. It had been shown by some investigators that at two different SO_2 concentrations the orders of resistance to breakdown of some materials could be reversed.

The influence of ultra-violet light on the longer life of specimens exposed in a heavily polluted atmosphere, compared with a non-industrial atmosphere, was thought by Mr. Preston to be a matter of shielding of the paint film by the deposit of atmospheric debris. It was not unusual, he thought, to use black finishing paint, containing opaque pigments for tropical conditions, probably with the same objective.

Tests of Alloy Steels

The corrosion resistance of high-alloy steels to an industrial atmosphere was the subject of a well documented study by H. T. Shirley and J. E. Truman, of the Brown-Firth Laboratory, Sheffield, which Mr. Shirley presented.

He described tests designed to study the effects of composition and surface finish on the behaviour of higher alloy steels when exposed for prolonged periods to severely industrial atmospheric conditions, without attention to the cleansing treatment normally recommended. The intention was to provide information about compositions for use where regular cleansing would be impracticable, and to compare directly these higher alloy steels with lower alloy steels exposed under similar conditions.

There were 450 samples, covering 22 steels and 5 non-ferrous materials, all in sheet form. The three types of surface finish tested were pickled, emeried, and mirror-polished. Exposure was for two and five years with vertical specimens, and 5 years with specimens exposed at 12° to the horizontal.

Most Resistant

The behaviour of 18/8/2½ chromium-nickel-molybdenum and 24/12/3 chromium-nickel-tungsten steels was outstandingly good, and losses were of the order of only one thousandth those of mild steel. In general, the more resistant steels tended to show higher losses by the emeried samples, than by the other two surface finishes, the effect being small for the vertical exposure stands, but more considerable in the case of the horizontal stands.

Although comparison with earlier tests for one month and one year indicated a general tendency for higher rates of loss in the initial stages of exposure, there was no indication of any notable change in rate attack with time over the 2-year to 5-year periods.

The results for the non-ferrous materials were in line with those expected from previously published figures and showed all five materials to give higher losses than most of the special steels. Although in some cases this might be offset to some extent by pitting tendency in the steels, the outstanding superiority of the 18/8/2½ chromium-nickel-molybdenum and 24/12/3 chromium-nickel-tungsten steels was clearly demonstrated, their losses being of the order of only a hundredth of those of the non-ferrous materials.

Mr. Shirley pointed out that the hopes which had long been entertained of the development of a low alloy steel with very high corrosion resistance had faded, though such steels had in fact been developed with four times the corrosion resistance of mild steel. It was therefore necessary to look to the more highly alloyed steels to find the necessary corrosion resistance for use in severe conditions, in spite of their relatively high price.

Better than Silver

Mr. Turner said that the Atmospheric Corrosion Sub-Committee, of which he was chairman, had greatly welcomed Mr. Shirley's data, which they regarded as a most valuable contribution.

Some of the highly alloyed steels might not be "as good as gold" but they were certainly better than silver as regards corrosion. Even the earlier form of 18/8 corrosion resistant nickel-chromium steels had proved of great help. They had been used in the United States for Budd welded corrugated all-steel coaches. The earliest of these trains were now coming into the shops after many years' service and the stainless steel was in perfect condition.

It was therefore of importance that the markedly superior corrosion resistant steels, some of which stood out so clearly in Mr. Shirley's paper, might soon become available, and BISRA should take every possible step to make such materials available to industry here.

Dr. Vernon commented on the remarkably good results obtained from the low-alloy Ni-Cr-Mo steel. Although rusting was not suppressed, the efficiency, weight for weight, of the alloying elements, was even greater than for the higher-alloy steels. Mr. Britton confirmed that molybdenum additions to chromium nickel stainless steels improved their per-

formance on exposure in railway tunnels —from 50 per cent of the surface pitted to a few scattered small pits.

Dr. J. C. Hudson, head of the BISRA Corrosion Laboratory, presented a paper on "The atmospheric corrosion of iron and steel wires." This described the results of tests on the corrosion of ferrous wires when exposed in an industrial atmosphere for periods of up to 10 years. The rate of corrosion did not vary appreciably with duration of exposure, but was effected by the diameter of the wire, being greater for thin than for thick wires. Certain wrought irons and low-alloy steels proved much more resistant than mild steel. In particular, three chromium-copper steels, containing from 0.6 to 0.9 per cent of chromium and 0.5 per cent of copper, showed a remarkable superiority over mild steel after 10 years' exposure in Sheffield, having suffered only from one-third to one-half of the loss in weight or tensile strength of the latter.

It was remarked, in the discussion which followed this paper, that every effort is made by enlightened engineers to encourage the use of these superior steels or to secure the adoption of superior anti-corrosion measures, but in general it was extremely difficult and often impossible to persuade the purchaser to look beyond the initial cost of the structure.

Mr. J. Dearden, the chief metallurgist at the scientific research department of the British Railways, London Midland Region, presented a paper on "Climatic effects on the corrosion of steel."

Rainfall No Guide

Exposure of specimens to the atmosphere in Derby over a number of years had been used in an attempt to correlate the corrosion of steel in a moderately industrial atmosphere with the hours of rainfall registered by a recording rain gauge. No such relation was found, as only 35-40 per cent of the total corrosion occurred during the hours when the rainfall was sufficient to register on the gauge. A further 35-40 per cent was due to the effects of humidity, and the balance is presumed to have occurred during periods of drizzle, not recorded as rainfall.

In a discussion, Dr. Vernon observed that the method adopted by Mr. Dearden had over-emphasised corrosion due to rain and had correspondingly vitiated his estimate of the relative contributions of other weather factors. In industrial atmospheres rain was largely beneficial in washing off corrosive deposits.

Mr. T. Henry Turner welcomed Mr. Dearden's paper because much work was needed on micro-meteorology. The liability to corrosion must vary from street corner to street corner and not merely from country to country, depending on the locality of sulphur dioxide emissions from power houses and soot from houses.

During the afternoon session the following papers were presented and discussed: "The effect of shot peening upon the corrosion fatigue of high-carbon steel" (Dr. U. R. Evans, F.R.S.); "Corrosion fatigue of steel under asymmetric stress in sea water" (Dr. A. J. Gould, Sheffield University); "High-speed rotor tests of paints for under-water service" and "Electrochemical studies of protective coating on metals" (Dr. Wormwell).

Steel Needs in the Far East

WITH the exception of those of India, the existing plans of countries in the ECA Far Eastern region for the establishment of the iron and steel industry do not provide adequately for present or future requirements, states a recent report adopted by the Industry and Trade Committee of ECAFE at Singapore.

Among the principal causes of delay in carrying out plans is the shortage of finance, chiefly of foreign exchange, for the purchase of equipment.

The report noted that in four countries of the region—the Philippines, Indonesia, Ceylon and Burma—the plans called for development of iron and steel industry by re-melting scrap.

Japan has more than 4 million tons of scrap on hand, and would only consume an estimated 1.3 million tons a year.

Information from Pakistan indicates a shortage of scrap; India is stated to have a shortage of melting and re-rollable scrap.

The report recommended a survey of geological and industrial research laboratories in the ECAFE region, under governmental and private auspices—in Australia, New Zealand and Japan.

Africa's New Leathercloth Industry

ANOTHER stage in the industrial development of South Africa was marked by the recent opening at Somerset West of the new African Explosives and Chemical Industries' paint and leathercloth factory by Mr. D. de Waal Meyer, secretary of the Department of Commerce and Industry. This is the first undertaking to make leathercloth in South Africa.

Technicians of Imperial Chemical Industries, Ltd. (which owns 50 per cent of the A.E. & C.I. capital), had been sent out to assist in the initiation of the scheme.

The new plant has been designed on most modern lines. The more inflammable types of manufacture, such as the special putties for the motor-car industry, are isolated in individual buildings to reduce fire risk. Paint factories cover an area of about nine acres, and have been equipped with the latest machinery at a cost of £250,000.

The factory is making specialised products such as Duco and Dulux, which were developed in America by E. I. du Pont de Nemours, Inc. Until production started at Somerset West, South Africa had to depend on imports for the increasing quantities of these products used.

The pigments and other raw materials still come from overseas. To make the 300,000 gal. of finishes that can be produced annually in a five-day week, much raw material must be imported.

Not all the leathercloth machinery has yet been installed, but the whole process of coating the base of cotton fabric with nitro-cellulose, softening with plasticisers and colouring with pigments will be carried out. The fabric will be grained or embossed by rollers, and can be given a gloss or matt finish as desired.

At the opening ceremony, Mr. D de Waal Meyer said that the devaluation of sterling in the U.K. was only likely to have an effect on the new plants in so far as it would be necessary to import raw materials from hard currency regions.

LETTER TO THE EDITOR

Survey of Chemical Industry

SIR,—It should be recorded that we are not one of the sixty non-members reported to have been consulted by the Association of British Chemical Manufacturers when preparing the above report for the Board of Trade.

Because we suspended manufacture of certain chemical products, for the very good reasons set out in our circular of February 2, 1948, and sold redundant plant and machinery, it does not follow we have retired and have no long term plans and probable lines of development.

We remain actively engaged in the production of barytes, an essential raw material extensively used in the chemical industry, and our freehold factory of 25 acres, with buildings, railway, electricity, gas and water services remains intact.

As is well known, our achievements over the past 20 years include the production of tens of thousands of tons of TNT and other toluene nitration products, barium chloride, ferric and ferrous chlorides, soda crystals, etc. Given the right conditions we see no reason why our factory should not again do equally well.—Yours, etc.,

ATHOLE G. ALLEN,
Governing director.

Athole G. Allen (Stockton), Ltd.,
Stockton-on-Tees Chemical Works.

PARLIAMENTARY TOPICS

IN a written answer to Sir W. Darling, the President of the Board of Trade (Mr. Harold Wilson) stated that Hyflo Supercel was the trade name for one type of diatomaceous earth imported from the U.S.A. Diatomaceous earths were also imported from a number of other sources including France, Algeria, Spain, Kenya and Norway. Imports were on private account, and users had been for some time encouraged to use material from non-dollar sources. Imports from soft currency sources had, in fact, been on Open General Licence since October 5.

REPLYING to a question from Sir Patrick Hannon, the Minister of Education (Mr. George Tomlinson) said that every effort was being made to encourage the interchange of technicians between the U.S.A. and this country. Some 200 applications had been received for the 50 vacancies available under the arrangements made with ECA for British scientists and technologists to study in America. Eight successful applicants had already gone to the U.S.A. Selection of the remainder to the number of about 40 was in progress, and it was hoped that they would leave in January next year. It was not possible rigidly to classify successful applicants.

The Chemist's Bookshelf

ORGANIC REACTIONS. Ed. Roger Adams. London: Chapman and Hall. Vol. IV, pp. 428. 36s.

Volume IV of this well known series needs little introduction. The first volume appeared in 1942 and the series aims at covering the more important reactions which are likely to be encountered in any research project. Because each chapter dealing with a particular reaction is written by an expert in that field a great deal of information is provided concerning the utility of the method and the expected yields. An especially useful aspect of this series is the incorporation at the end of each chapter of a list of all known components which either undergo the reaction discussed or which have been prepared by it.

The Diels-Alder reaction, using maleic anhydride and other dienophiles, which has been widely used for the preparation of ring compounds and the investigation of certain natural products, notably sterols, is the subject of the first two chapters. Other sections deal with the preparation of amines by reductive alkylation, the formation of acyloins and of benzoins. It is of interest to note in the latter connection that some of these compounds were used by the Germans as therapeutic agents.

The concluding chapters cover the preparation of benzoquinones by oxidation, the preparation of aldehydes by the Rosenmund reduction of acid chlorides and the Wolff-Kishner reduction of carbonyl compounds to hydrocarbons. This volume forms a welcome addition to the series, whose previous high standards it well maintains.

A BIBLIOGRAPHY OF DYEING AND TEXTILE PRINTING. L. G. Lawrie, A.R.I.C. London: Chapman & Hall, Ltd. Pp. 143. 15s. net.

Only once, it would appear, has there been provided a comprehensive bibliography concerned with the art of dyeing. That was prepared by Jules Garçon in 1893. The aim of the author of the present work is to provide, in concise form, information of value to the historian, scientific worker and practical dyer alike. His book is a guide, however, and only the broad outline of literature on dyeing and textile printing, embracing 816 relevant books in the past four and a half centuries, can be given. Part I is a list, in alphabetical order of authors, of books printed from 1500 to 1946; Part II gives a short-title list of works in chronological order. There is a classified subject index which makes this handy volume a very ready means of reference.

RECENT ADVANCES IN ORGANIC CHEMISTRY. (7th Edition). A. W. Stewart, revised by H. Graham. London: Longmans, Green & Co. Vols. II and III. Pp. 447 and 587. 35s. each.

Volume I of this series appeared first in 1908 and the material was subsequently expanded into two volumes. The publishers state that Volume I can no longer be regarded as dealing with *recent* advances in organic chemistry, being mainly of historical interest, and now out of print. The material formerly contained in Volume II is now reissued in modified and expanded form as Volumes II and III.

A similar statement might have well been made concerning the present volumes. There can be little excuse in a book purporting to deal with recent advances, for the inclusion of a discussion of Sugden's parachor (1924), Purdie's methylation of the sugars (1908) or much material on the terpenes which dates from the early 1920's. Details of some recent work have been incorporated as is instanced by a discussion of recent work on starch, pectin and alginic acid, while the chapters on vitamins and sterols have been brought up to date.

There is a definite place for an advanced textbook of organic chemistry which will review the recent advances in selected fields, but methods of presentation have changed, and rather than revising earlier editions it would seem better to produce a completely new book, along similar lines, where the author will not be restricted by previous traditions.

Technical Publications

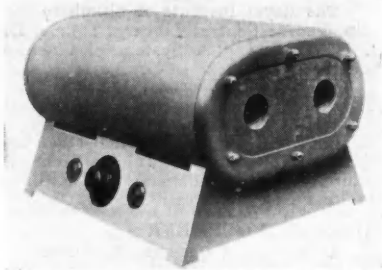
THE cutting of profiled shapes in steel, with a drawing as guide, by means of a serrated, electrically driven wheel has, until recently, depended for its accuracy on the skill of the operator. Now a device has been produced whereby the tracer wheel is controlled automatically: this is an electronically controlled oxygen cutting machine, the characteristics of which are described in a leaflet just issued by Hancock & Co. (Engineers), Ltd., of Croydon. The tracer is fitted to a profiling machine with the electronic tracer fitted to the side of the top transverse carriage; and the wheel, instead of engaging the drawing table, is in contact with the top of a cylinder which is mounted on the main lower carriage. A spot of light is projected downwards from a position adjacent to the tracer wheel, which impinges on a drawing on the drawing table.

* * *

THE second edition (1949) of the French publication, "Tables à l'usage des usines fabricant des acids mineraux (H_2SO_4, HNO_3 and HCl," has just been issued by Etab. Kuhlmann, through l'Industrie Chimique, 8, rue de Miromesnil, Paris, 8. It has been compiled by Paul Gavelle, Directeur de Laboratoire Central d'Analyses des Etab. Kuhlmann, and contains about 90 quarto pages of tables and costs Fr. 250. Particular attention has been directed to aerometric and densimetric data, to densities, specific weight, and specific mass; matters concerning which, says the author, many chemists have forgotten the elements. Apologies are offered for still speaking of deg. Baumé, strictly and legally defunct since 1919, but still used by chemists in most branches of chemical industry. Hydrochloric and nitric acids have been included: (1) Brief historical survey of the Baumé densimeter and aerometer, with definitions of relative and absolute densities, sp. wts., and of specific mass; (2) strengths of solution of the three acids as a function of density and deg. Baumé; (3) tables whereby titres of manufactured sulphuric acids, either above or below the commercial standard, may be adjusted to that standards; and (4) tables relating to control of oleum distillation.

* * *

A FULL survey of laboratory and industrial heating appliances is afforded by six new publications issued by the General Electric Co., Ltd., London. The series



[Courtesy, The General Electric Co., Ltd., London

Double tube muffle (PH/M92) operating at temperatures up to 1000°C., suitable for analytical and works laboratories

includes indicating pyrometers and temperature controllers; laboratory type furnaces; and small workshop, high-temperature, melting, and horizontal and vertical furnaces, giving their specifications, dimensions and prices.

* * *

SCIENTIFIC methods for the formulation of paints, processes of manufacture and application techniques depend upon trained and experienced staff. In order to supplement the training of its own employees, Imperial Chemical Industries, Ltd., Paints Division, prepared a short introductory guide to literature on the technique of paint application, and paint varnish and lacquer technology. As it is felt these lists are also of interest to its customers and business associates, revised editions may be obtained on application to I.C.I., Paints Division, Slough, Bucks.

* * *

IMPROVEMENT to the *p*H meter (type D.-303) are discussed by A. Cooper in the current issue of "Technique" (Vol. 3, No. 4), published by Muirhead & Co., Ltd., Beckenham, Kent, while the second feature by P. Wall Row is devoted to the rapid processing of photographic materials.

* * *

SOME of the wide variety of uses of ropes—ranging from towing cables for fishermen, and nets to catch pouches on mail lines, to the complicated system of ropes and pulleys in the flies of a modern theatre—are the subject of articles in "Rope Talks" (No. 22), just issued by British Ropes, Ltd., London.

Next Week's Events

MONDAY, NOVEMBER 7

The Royal Institute of Chemistry

Stockport: Central Library, 7 p.m. Dr. G. N. Dyson: "A System of Chemical Nomenclature."

Society of Chemical Industry

London: Royal Institution, Albemarle Street, W.1., 6.30 p.m. (Joint meeting of the London Section with the Food and Agricultural Groups). Jubilee Memorial lecture. E. B. Anderson: "The Cow: Mankind's Benefactress."

TUESDAY, NOVEMBER 8

Institution of Chemical Engineers

London: Burlington House, Piccadilly, W.1, 5.30 p.m. (Joint meeting with the Low Temperature Group of the Physical Society). Three papers on "Heat Transfer at Low Temperatures."

The Royal Institute of Chemistry

Norwood: Technical College, 6.30 p.m. N. Booth: "Careers for Chemists." Second of four meetings for students and senior children. Brains trust.

Incorporated Plant Engineers

Manchester: Engineers' Club, Albert Square, 7.15 p.m. J. Whitaker: "Industrial Ventilation."

Institute of Physics

Glasgow: University, 7 p.m. Prof. James Small: "Heat Pumps."

Hull Chemical and Engineering Society

Hull: (Joint meeting with Hull and District section, R.I.C.). T. Henry Turner: "Chemistry of Railways."

WEDNESDAY, NOVEMBER 9

The Chemical Society

Manchester: University. Symposium on "Some Chemical Aspects of Atomic Energy," introduced by Dr. R. Spence. Morning session, 10.30 a.m. J. S. Anderson: "The Place of Transuranic Elements in the Periodic Table." Afternoon, 2.30 p.m. G. B. Cook: "Recent Developments in Fission Product Chemistry"; E. Glueckauf: "Solution Chemistry of Uranium and Thorium." Evening, 5.15 p.m. W. Wild: "The Chemical Effects of Radiation."

Society of Chemical Industry

London: Imperial Institute, South Kensington, S.W.7. 6-9 p.m. Third conversazione of the Food Group. Informal reception by Sir Harry and Lady Lindsay.

Manchester Metallurgical Society

Manchester: Engineers' Club, Albert Square, 6.30 p.m. E. Voce: "Recent Developments in Copper and Copper Alloys."

THURSDAY, NOVEMBER 10

The Chemical Society

Hull: University College, 6 p.m. (Joint meeting with Hull University College Scientific Society). Prof. N. K. Adam: "Surface Films."

North Wales: Bangor, University College, 5.30 p.m. (Joint meeting with University College of North Wales Chemical Society). Prof. Wilson Baker: "A New Type of Aromatic Compound."

Nottingham: University, 6.30 p.m. (Joint meeting with Nottingham University Chemical Society). Prof. M. Stacey: "Organic Compounds of Fluorine."

The Royal Society

London: Burlington House, Piccadilly, W.1, 2.30 p.m. Discussion: "Detonation," opened by W. G. Penney.

Institute of Physics

Manchester: Reynolds Hall, College of Technology, 6 p.m. (Joint meeting of the Illuminating Engineering Society and Manchester and District Branch). Prof. H. Hartbridge: "Recent Advances in the Physiology of Colour Vision."

Pharmaceutical Society

London: 17 Bloomsbury Square, W.C.1, 7.30 p.m. T. C. Denston: "The British Pharmaceutical Codex, 1949."

FRIDAY, NOVEMBER 11

The Chemical Society

Aberdeen: Marischal College, 7.30 p.m. (Joint meeting with RIC and SCI). Tilden lecture. Prof. E. R. H. Jones: "Acetylene and Acetylenic Compounds in Organic Synthesis."

Society of Chemical Industry

London: King's College, Strand, W.C.2, 7 p.m. (Fine Chemicals Group). Dr. D. W. Adamson (Wellcome Research Laboratories): "The Chemistry of Antihistamine and Related Drugs."

Royal Statistical Society

South Wales: Technical College of Monmouthshire, Crumlin, 7 p.m. D. R. G. Davies: "The Use of Statistical Method in Steel Plants in the U.S.A."

Oil and Colour Chemists' Association

Manchester: Engineers' Club, Albert Square, 6.30 p.m. A. R. Dunton and H. Hampson: "Recent Observations on Anti-Corrosive and Protective Finishes."

The Royal Institution

London: 21 Albemarle Street, W.1, 8 p.m. A. G. Gaydon: "Flame Spectra."

HOME

Commonwealth Sugar Conference

A conference to discuss long-term arrangements for the purchase of Commonwealth sugar by the United Kingdom is due to begin in London on November 21.

Science Laboratory Extension

Lancashire County Council recommends that £12,346 shall be spent on altering and extending the Forensic Science Laboratory at Preston.

New Works to Cover Overseas Trade

To cope with expanding trade with Australia, Brazil, Canada, New Zealand, etc., J. G. Jackson and Crockatt, Ltd., has moved from Glasgow to a new factory on the industrial estate, Nitshill Road, Thornliebank. The telephone number is now Giffnock 391 and the telegraphic address "Jackro, Thornliebank."

Oil Refineries' Big Component

Slung between two bogies and drawn by a lorry with a crew of seven, a 55-ton metal tube, 94 ft. long and 9 ft. in diameter, passed through the Mersey Tunnel recently on its way from Dukinfield, Cheshire, to Thornton-le-Moors, near Chester, where it will be used in the Shell oil refineries.

Man-power Decline in Coalfields

Man-power in the coalfields fell by another 1100 in the week ending October 22, the total figures showing a reduction from 724,400 to 709,500. Coal output last week was 4,405,100 tons, 45,200 tons less than the week before, although output per manshift reached a new level of 3.10 tons at the face and 1.20 altogether.

Housing Scheme Deferred?

Confirmation of the fact that I.C.I., Ltd., will not be able to realise in its entirety its scheme to create for workers an estate of 1000 houses near Huddersfield is contained in the group's offer to sell to Huddersfield corporation land it acquired for building at Bradley. The town clerk has been authorised to purchase the land at a valuation.

Steel Records

For the week ended October 22, steelworkers of John Summers & Sons, Ltd., created a record in local steel output. At Hawarden Bridge works, Shotton, 11,192 tons of steel ingots were produced, while the Shelton works at Stoke-on-Trent turned out 5484 tons. These tonnages had never previously been reached at the Shotton or Shelton works.

Fire at Iron Foundry

Damage estimated at £2000 was caused by a fire last week at the foundry of James Smethurst & Sons, Ltd., Warrington, which caused the roof to collapse.

Norwegian Research Council

The post of administrative director of the General Scientific Research Council (Norges Almenvitenskapelige Forskningsrad) is advertised as vacant; applications must be received in Oslo by November 20.

University Chemistry Expansion

The chemistry department of Glasgow University is included in the £500,000 extension planned by the authorities. This information was given recently by the principal when he detailed the various extensions and improvements involved within the University.

New Rates for Zinc and Oxide

A Ministry of Supply Press notice on October 28 calls attention to the fact that zinc oxide manufacturers would raise prices of zinc oxide by £1 15s. from that date. The new prices are: Red Seal, £80 15s.; Green Seal, £82 5s.; White Seal, £83 5s. Another Ministry bulletin issued at the same time indicated that Government prices for good ordinary brand zinc metal would increase on the same date by £2 per ton delivered—to £83 10s.

Tightening Control of Pollution

The minimising of river pollution in the Scottish Borders has been carried a stage further by the River Tweed Commissioner, who has now submitted reports on samples taken near Kelso and Melrose. These disclose a considerable amount of pollution from sewage discharge and the County Council is taking up the matter. It is expected that all sources of pollution will be dealt with, including industrial effluents.

Plastics Technicians Fly to India

Following the sale by Tenaplas, Ltd., the extruded plastics manufacturers, of Upper Basildon, Berkshire, of £60,000 worth of plastics extrusion machinery to the Mysore government for a new factory in Bangalore, three Tenaplas technicians flew to India from Heathrow airport on November 1, to help set up the machinery and put it in running order. They have three months' leave of absence, and their return fare by plane and their expenses during three months in India are being paid by the Mysore Government.

PERSONAL

MR. J. B. CALDWELL has been awarded the research scholarship in the application of light alloy to ship construction (£400 a year for two years), presented by the Aluminium Development Association.

A presentation of an inscribed silver cigarette box was made last week to MR. VICTOR BLAGDEN by members of the British Chemical and Dyestuffs Traders' Association as a token of their affection and esteem. The ceremony marked the retirement, earlier, of Mr. Blagden from the presidency of the association, a position which he had held with distinction for 26 years. In 1944 he was presented with his portrait in oils, and this now hangs in the board room of the association.

Following his resignation as director of engineering for the U.S. Atomic Energy Commission, MR. ROGER S. WARNER has joined the staff of Arthur D. Little, Inc., Cambridge, Massachusetts, research and engineering organisation. Mr. Warner was in charge of initiating the Commission's post-war construction programme, developing improved chemical processes, such as those for the recovery of uranium and plutonium, and disposing of radioactive wastes. He was also in charge of technical operations for the Bikini atomic bomb tests, and from 1944 to 1947 had been director of the Los Alamos Laboratory's ordnance division, which handled engineering design, assembly and testing of the early atomic bombs.

DR. CHARLES GLEN KING, scientific director of the Nutrition Foundation, New York, and professor of chemistry at Columbia University, is to receive the medal and $1000 John Scott Award of the City of Philadelphia for his "outstanding work on the chemistry of vitamin C." Dr. King has won world-wide recognition for his contributions to the isolation, chemical identification, and synthesis of vitamin C (ascorbic acid), for his studies of enzymes and his work on the molecular structure of sugars and fats. The award was bequeathed in 1816 to the City of Philadelphia with the sum of $4000 by John Scott, an Edinburgh chemist. By 1917 the fund had grown to $100,000 and a court order was obtained permitting the distribution of premiums larger than the original $20.

THE TEXTILE INSTITUTE

ELECTION of two new Fellows and seven new Associates has been announced by the Textile Institute.

The Fellows are MR. COLIN GARRETT, who has been responsible for many processes and investigations in the chemistry and practice of bleaching and dyeing, and MR. HERBERT EDWIN GARTSIDE, who has introduced several modifications of textile machinery.

Elected Associates are:—Alfred Ernest Walsh, Albert Glover & Sons, Ltd., Morley; Frank Henry Seal, Staple Fibre Department, British Celanese, Ltd.; Robert James Sheddon Linn, Courtaulds, Ltd.; Bela Fehertoi, Hungarian Textile Industry, Department of Rationalisation; Homi Darashaw Lentin, J.K. Cotton Spinning and Weaving Mills Co., Ltd., Cawnpore, India; Keshow Ranjan Prasad Sinha, The Delhi Cloth and General Mills Co., Ltd., India; Duncan Ernest Moffat, Kaiapoi Woollen Manufacturing Co., Kaiapoi, New Zealand.

Obituary

PROFESSOR EMERITUS THOMAS SLATER, PRICE, whose death, at the age of 74, was reported last week, was formerly professor of chemistry in the Herriott-Watt College, and held the chair of chemistry, Edinburgh University, from 1931 until his retirement in 1940. Born in 1875, the professor was head of the chemical department of the Technical College, Birmingham, from 1903 to 1920, and for the following ten years he was director of research of the British Photographic Research Association. During the 1914-18 war, Prof. Price gave outstanding service as naval representative on the chemical warfare committee. He had been vice-president of both the Institute of Chemistry and the Chemical Society.

The death was announced last week of DR. JACK ARNOLD SCHEDLER, technical manager and director of the Clayton Aniline Co., Ltd. The doctor, who was 49, joined the company as a chemist in November 1924. He became a departmental manager in 1940, and assistant technical manager six years later. His father, Dr. Arnold Schedler, a former Swiss Consul in Manchester, had also served the company as technical manager and director.

OPPOSITION TO STANDARDS SCHEME IN SOUTH AFRICA

Duty Free Rhodium Trichloride?

From OUR CAPE TOWN CORRESPONDENT

OPPOSITION is being offered from several quarters of South African industry to the relatively high charges being imposed for the use of the new certification and marking schemes sponsored by the South African Bureau of Standards. For example, members of the paint, disinfectant, petroleum jelly and allied industries say they will not ask for the assistance of the bureau or accept the mark—the elliptical sign with "S.A.B.S." inscribed. The S.A. Polish Manufacturers' Association wants the fees reduced before any of its members will co-operate. One polish manufacturer says that, on the present terms, he would have to pay £6000 a year for the privilege of using the mark. He suggests that a flat rate of a few hundred pounds a year would be quite enough for the service.

A chemical manufacturer says that some time ago, when the bureau was ready to prepare specifications for the products he makes, he was asked to advise on the way charges should be fixed but, when they were finally gazetted, they were too high. He says he will not take the mark if it means that representatives of the bureau can inspect his factory to check on him, which is "policing of private enterprise by the Government." Actually, few chemical or allied firms have taken the mark, he says. Two have done so for DDT products and two for re-refined oils.

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When the abattoirs at Maitland, Cape Town, are modernised the Meat Board may initiate a new system of spray-drying blood, which will increase its value as a by-product. At present a vast quantity of blood is processed in roller driers, which produce a coarse material suitable only for fertiliser and animal feed. When the new principles of spray-drying are used, various products for human consumption can be made, it is stated. Regarded as the most important is blood plasma powder, used by the baking industry as a substitute for egg albumen, and by sausage manufacturers as a flavouring. One big fishing firm in Cape Town is using a spray-drier to extract vitamin B from its by-products.

Cement production in the Union remains on a high average level. New plants scheduled to reach the production stage towards the end of this year will probably fill the gap between present-day requirements and the available supply.

Cyanide is now being manufactured by a recently established division at Klipspruit, of a prominent firm of chemical manufactures.

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In the near future, dependent on the arrival of machinery, leathercloth of all qualities, colours and designs will be made in the Somerset West plant of African Explosives and Chemical Industries, Ltd. Up to the present, output has been undertaken on a limited scale. The material is stated to be in every respect identical with that made in the leathercloth division of Imperial Chemical Industries. In the same factory I.C.I. type Damasclene nitrocellulose coated material is being made. They will shortly be available in a wide range of colours. It is also planned to undertake the manufacture of a PVC coated fabric known as Vynide. This is to be given a tougher coating than the Rexine (*see page* 641).

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An application has been received by the S.A. Board of Trade and Industries for the free admission of rhodium trichloride for the manufacture of a catalyst in producing calcium cyanide. Rhodium trichloride is dutiable under tariff item No. 335 at 10 per cent, ad valorem, while calcium cyanide is admitted free of duty. Under another tariff schedule, certain catalysts used in making sulphuric and nitric acids, viz., vanadium mass, and platicised asbestos mass, are admitted under rebate of duty. Rhodium trichloride is used in conjunction with platinum chloride, which is admissible free of duty, to produce a platinum-rhodium catalyst mass for making hydrocyanic acid, which is subsequently absorbed in lime to form the calcium cyanide. The rhodium-platinum catalyst mass is thus used in the first stage of the manufacture of cyanide. The equipment for a large cyanide plant has been received and has begun production.

OVERSEAS

W. German Potash Exports

An export quota fixed at 100,000 tons of potash for the year 1949-50 has been allowed to Western Germany. This represents almost double the amount of potash exported at present. Value of the 1949-50 exports is estimated at $10 million.

Germany Doubles Chemical Export Value

An increase of almost 100 per cent in the value of German chemical exports has taken place during the past year. The value of chemical exports from bizonal Germany through the Joint Export-Import Agency in the first half of this year was equivalent to $4,466,000 monthly, compared with a monthly average of $2,265,000 in 1948. This is recorded by the U.S. Department of Commerce.

Italian Cellulose Experiments

The Italian Ministry of Industry is striving to develop the use of straw in paper manufacture. Some 100,000 tons of surplus straw are available yearly in Italy and it is calculated that about 50,000 tons of cellulose could be produced. The State Experimental Centre has been conducting a series of experiments to raise the quality of the cellulose and a suitable technical process is about to be completed.

Thistle Substitute for Linseed

Oil suitable for use as a substitute for linseed oil in paint manufacture, has been extracted from the saffron thistle in New South Wales. A report, by the State Department of Agriculture, stated that the thistle yields 20 gal. of oil to a ton of seed. Linseed yields approximately 70 gal. of paint oil to the ton. Tests on the thistle were conducted by Harold Meggett, Ltd., of Sydney, one of the largest Australian paint materials manufacturers.

Italian Gas Engineering

The new pipe-line for methane at Marghera is the first instalment of the line which is to reach also Venice and Murano and Treviso. The new line differs from its predecessors in Italy, the stretch from Contarina to Mira Taglio (56 km.) consisting of 10-in. pipes, instead of 7-in. All these underground pipes are of steel, electrically welded, and protected against corrosion. The maximum capacity is 900,000 cu. m. a day. Several large industrial firms, such as Pirelli, Dalmine, Marelli, and municipalities like Padua, Verona and Rovigo, are transforming their plants to use methane instead of coal.

Italy's Brown Coal

During the first nine months of the current year 729,813 tons of Suicis coal were extracted in Italy. This represents an increase of 12,254 tons above the corresponding period of 1948, but is less than in 1947.

British Fan for Chilean Mine

A four stage axial-flow ventilating fan, weighing 130 tons and claimed to be the most powerful of its kind in the world, will shortly be dispatched from the Pagefield ironworks of Walker Bros., Wigan, for delivery to the Schwager coal mine, Valparaiso.

State Monopoly for Medical Supplies

A Bill to enable the State to take over the import and wholesale trade in medical supplies will be one of the first matters to be considered when the new Norwegian Parliament meets in January. It is proposed to set up a State Medical Depot which would control prices and maintain a strict watch on quality.

Big Investment for Orlon

E. I. Du Pont de Nemours & Co., states a *Reuter* report from Wilmington, U.S.A., is to spend the equivalent of £7,860,000 on the new synthetic fibre, Orlon, which will go into commercial production late next year The new fibre will be spun into hoods for cars, tents, tarpaulins, fibre cloths, curtains and to form a variety of industrial fabrics.

Fibreglass For Oil Pipes

As a result of technical discussions and trials, large quantities of Fibreglass staple tissue have been applied as a protection to pipe lines in the Middle East. The largest single use so far, is that of the Iraq Petroleum Co. on its 16-in. pipe connecting Kirkuk with Tripoli, a distance of about 600 miles. When completed, some 14 million sq. ft. of Fibreglass staple tissue will have been used.

Aluminium Production Record

The average daily rate of production of primary aluminium in the U.S.A. during May was the highest since 1944, and the total of 56,909 short tons for the month established a post-war record. Reflecting both lowered demand and increased level of production, inventories at reduction plants were more than doubled during the month. Stocks at the end of May reached 24,634 short tons, the largest since October, 1947.

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ARKWRIGHT CHEMICALS, LTD., London, S.W. (M., 5/11/49.) October 10, £950 mortagage, to T. C. Whittaker, Manchester; charged on 82 and 84 Clopton Street, Hulme, Manchester. *Nil. December 25, 1948.

EAST RIDING CHEMICAL CO., LTD., Hull. (M., 5/11/49.) October 7, £1000 (not ex.) and £2500 (not ex.) charges, to Lloyds Bank, Ltd.; charged on land with factory and other buildings at Ryde Avenue, Hull, and dwelling-house and sale-shop 26 and cottages 18, 20, 22 and 24 Wilson Street, Anlaby. *Nil. February 14, 1949.

FERRAND LUTTMER PLASTICS, LTD., Felpham. (M., 5/11/49.) October 6, £800 debenture to C. E. W Ferrand, Chichester, and £1500 debenture, to G W. Ferrand, Chichester; general charges.

SOUTHERN METALLISERS, LTD. (formerly WESSEX METAL SPRAYERS, LTD.)., Fareham. (M., 5/11/49.) October 11, £700 debentures, part of a series already registered.

Satisfactions

GREAT BRIDGE OIL CO., LTD. (M.S., 5/11/49.) Satisfaction of £1500, registered February 27, 1939.

TYBORITE, LTD., Cheam, plastic manufacturers, etc. (M.S., 5/11/49.) Satisfaction, October 10, of mortgage and charge registered November 1, 1948

New Registrations

Aerial Spraying Contractors, Ltd.

Private company. (474,175). Capital £5000. Contractors for the spraying and treatment of land and growing crops by fixed wing aircraft, etc. Directors: F. S. Collins, Mrs. P. M. Moffatt. Reg. office. 115B High Street, Boston.

Ashton Products (1949), Ltd.

Private company. (474,325.) Capital £1000. Objects: To acquire from W. S. Ashton, R. L. Okell and H. Rawlinson, the assets of the business carried on by Ashton Products, Ltd. (in voluntary liquidation), manufacturers of insecticides, detergents, etc. Directors: W. S. Ashton, R. L. Okell, H. Rawlinson and J. S. Rimmer. Reg. office: 3 Church Road, Garston, Liverpool 19.

Ferro-Betol, Ltd.

Private company. (474,342). Capital £10,500. Manufacturers of oils, paints. pigments, varnishes, chemicals, etc. Solicitors: Slaughter and May, 18 Austin Friars, E.C.2.

E. F. Galton and Co., Ltd.

Private company. (474,259). Capital £1500. Manufacturers of chemicals, detergents, solvents and fatty alcohols, oils, etc. Secretary: W. E. D. Smedley. Reg. office: 36 Southampton Street, W.C.2.

Company News

Staveley Coal & Iron Co., Ltd.

Progress of the subsidiary companies of the Staveley Coal & Iron Co., Ltd., which include the recently formed Staveley Iron & Chemical Company, was reviewed recently by the parent company's chairman, Mr. David N. Turner.

During the past year approval had been given in principle by the Iron and Steel Board to the scheme for the improvement of blast furnaces and by-product plants. New coke ovens were also to be built.

Output of pig iron, 22,000 tons in excess of the previous year's figures, was an all-time record. A record quantity of tar had also been distilled—3000 tons more than last year.

Increases of Capital

The following increases in capital have been announced:—CHEMICAL & PETROLEUM INVESTMENTS, LTD., from £200,000 to £300,000. WILLIAM BLYTH & CO., LTD., from £250,000 to £500,000. LIVERPOOL BORAX CO., LTD., from £65,000 to £95,000.

The Stock and Chemical Markets

STOCK markets have not recovered from the heavy selling of British Funds which developed last week and brought 2½ per cent Treasury Bonds ("Daltons") and nationalisation stocks down to new low levels. The fall in Gilt-edged affected leading industrials which moved rather lower as a result.

Rising costs of materials, etc., following devaluation of the £ mean that many companies may have to face reduced profits as a result and their shareholders accept lower dividends.

Chemical and kindred shares have reflected the general trend, moving back towards the end of last week, and since becoming firmer and rallying moderately. Imperial Chemical are changing hands around 42s. 9d. at the time of writing. Monsanto are steady at 51s. 3d., with Brotherton at 20s., Fisons 28s., Burt Boulton 24s. 6d., Laporte Chemicals 5s. ordinary at 9s. 3d., Lawes Chemical 9s. 4½d., Albright & Wilson 30s 3d., and British Glues & Chemicals 4s. ordinary remain at 18s. Turner & Newall eased to 73s., and United Molasses to 37s. The 4s. units of the Distillers Co. have been fairly well maintained at 25s. 6d., but British Xylonite fell sharply to 62s. 6d. on the unexpected halving of the interim dividend to 2½ per cent. Other shares of companies connected with plastics became easier, De La Rue being 20s. 9d., British Industrial Plastics 2s. shares 4s. 9d., and Kleemann 9s. 3d.

In the metals market, British Aluminium have come back to 40s., although helped by the trend in dollar stocks, and International Nickel changed hands up to 58⅛. Shares of companies with important interests in the U.S. tended to remain firm, particularly Borax Consolidated at 57s. 6d. Elsewhere, General Refractories changed hands at close on 22s., while Glaxo Laboratories remained under the influence of the share bonus and were higher on balance at £18¾, after an earlier decline.

Iron and steel shares turned generally easier. United Steel have eased to 24s. 9d., Stewarts & Lloyds to 52s. 3d., Hadfields to 24s. 9d., and Dorman Long to 27s. 9d.

In other directions, Boots Drug have been active around 48s. 6d., Sangers were steady at 21s. 9d., with Beechams deferred better on balance at 13s., and Griffiths Hughes 18s. 6d. Lever & Unilever have eased to 41s. 6d. Oil shares failed to hold earlier gains.

Market Reports

THERE have been no important price changes during the past week for industrial chemicals and market conditions, although little altered, have a more settled appearance than at any time since the devaluation of sterling. The movement to the home consuming industries continues to be fairly substantial and in some directions buyers are showing more interest in covering future requirements. A steady export trade is reported from most sections and a good volume of new inquiry is in circulation. The demand for the potash chemicals, particularly carbonate and caustic, is good, while a steady outlet is maintained for the general run of the soda compounds. The call for the white and red leads continues steady. Other items in good request include the barium compounds, hydrogen peroxide and formaldehyde, while acetone and acetic anhydride are receiving fair attention. Conditions for the coal tar products remain uncertain but reports indicate an increasing interest. The demand for pitch is good at competitive prices.

MANCHESTER.—Fairly satisfactory trading conditions have been reported in most sections of the Manchester chemical market during the past week. Light and heavy products found a steady demand, against contracts, for home consumption and a fair amount of new business in many categories has lately been placed here. There has also been a fair flow of new inquiries from export markets. There has been little price movement.

GLASGOW.—Conditions in the Scottish chemical market have been unsettled because of the uncertainty of prices of many materials. This particularly applied to materials of which the price is affected by Government control of metals. There has been a heavy demand for petroleum jellies and oils of various descriptions in anticipation of the rise in price of these materials which has now been advised. The export market has been a little more active, receiving considerably more inquiries from the dollar areas. Reports on the possibilities of business in materials previously not competitive are not yet complete, but there are indications that a number of Scottish-produced materials will now find a dollar market.

Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Process of preparing a copolymer of vinylidene chloride.—Dow Chemical Co. June 2 1939. 629,137.

Methods of preparing alkylorthosolicates.—British Thomson-Houston Co., Ltd. June 19 1946. 629,138.

Emulsification and emulsifying compositions.—Shell Refining & Marketing Co., Ltd., P. J. Garner, and P. A. Winsor. June 23 1947. 629,139.

Piperidine derivatives.—Roche Products, Ltd. July 8 1946. 629,196.

Stabilised vinyl halide compositions.—B. F. Goodrich Co. March 1 1941. 629,142.

Rubber-like compositions.—Harvel Corporation. Aug. 17 1945. 629,145.

Production of ketones.—Courtaulds, Ltd., and D. L. Tyler. Oct. 31 1947. 629,211.

Synthetic resins and the production thereof.—J. E. Lennard-Jones, F. G. Willson, J. Pearson, F. A. Paine, and J. Vaughan. May 23 1944. 629,584.

Apparatus for delivering measured quantities of liquid.—P. O'Malley. Nov. 24 1945. 629,587.

Heavy duty lubricating oil compositions.—F. B. Dehn. (Union Oil Co.). Dec. 9 1944. 629,525.

Injection moulding of thermoplastic materials, particularly in the production of electrical insulation.—British Thomson-Houston Co., Ltd., and H. E. Cox. Jan. 10 1945. 629,645.

Process for the production of salts of phenol-aldehydes condensates.—C. J. Pedersen. Dec. 30 1944. 629,467.

Appparatus for measuring thicknesses.—G. Jacot, and J. Monti. May 15 1945. 629,648.

Production of cyclohexane.—I.C.I., Ltd., J. G. M. Bremner, and R. K. F. Keeys. March 29 1946. 629,405.

Preparation of materials having vitamin E activity.—Distillation Products, Inc. April 28 1945. 629,649.

Cellulose styrene compositions and methods of making the same.—Standard Telephones & Cables, Ltd. June 30 1945. 629,469.

Peroxides of sodium and/or potassium and method of making the same.—Mine Safety Appliances Co. Dec. 1 1944. 629,406.

Polishing metal surfaces.—A. D. Little, Inc. Feb. 2 1943. 629,603.

Apparatus for measuring electrically, properties of powdered, granular and like materials.—Marconi Instruments, Ltd., and J. A. Hampson. June 28 1946. 629,407.

Process for the preparation of aliphatic amino - polymethylene - carboxylicacid - amides.—Algemeene Kunstzijde Unie N.V. Nov. 13 1945. 629,534.

Production of complex zinc compounds and their application.—H. R. Frisch. Aug. 19 1946. 629,654.

Nitrogen and sulphur containing beta-substituted carboxylic acids and method of making same.—B. F. Goodrich Co. Oct. 5 1945. 629,537.

Manufacture of 2-tertiaryamino pyrimidine.—Pyridium Corporation. June 26 1946. 629,471.

Process for the production of penicillin.—Heyden Chemical Corporation. July 12 1945. 629,662.

Dispersion of rubber latex compounding ingredients.—Firestone Tyre & Rubber Co. Dec. 6 1945. 629,663.

Cellular thermoplastic materials.—Telegraph Construction & Maintenance Co., Ltd., H. F. Wilson, and D. E. Partington. Dec. 2 1946. 629,668.

Production of slots or holes in sheets of thermoplastic material.—F. Watson. (Kasy A./B.). Dec. 5 1946. 629,474.

Manufacture of metallisable monoazo dyestuffs of the pyrazolone series.—R. M. Hughes. (J. R. Geigy A.G.). Dec. 24 1946. 629,412.

Injector device for raising liquids containing matter in suspension.—E. Ventura. Sept. 30 1944. 629,477.

Production of antibiotic agents.—Abbott Laboratories. Feb. 14 1946. 629,479.

Process for the manufacture of pentaenes.—Roche Products, Ltd. Feb. 27 1946. 629,414.

Production of resinous materials.—Harvel Research Corporation. Oct. 7 1942. 629,481.

Radioactive units and method of producing the same.—United States Radium Corporation. Aug. 15 1941. 629,415.

Separation of alumina values from phosphorus-contaminated bauxite material.—Aluminium Laboratories, Ltd. Mar. 21 1946. 629,630.

Butt-welding of metal members by fusion and pressure.—Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procèdes G. Claude. March 23 1946. 629,687.

Spray-producing and atomising means.—W. H. Walton. March 14 1947. 629,686.

Production of heterocyclic nitrogen compounds.—E. I. Du Pont de Nemours & Co. March 27 1946. 629,482.

Cyclic acetals of pentaerythritol and their derivatives.—Geigy Co., Ltd., H. Jones, and J. K. Aiken. April 10 1947. 629,691.

Manufacture of organosilicon amines.—Corning Glass Works. May 16 1946. 629,483.

Continuous crystallisation.—E. P. Newton. (Koppers Co., Inc.). April 28 1947. 629,417.

Methods and compositions for treating metal surfaces.—American Chemical Paint Co. April 26 1946. 629,562.

Oxidation of hydro-carbons.—Distillers Co., Ltd., H. M. Stanley, K. H. W. Turck, D. C. Quin, G. P. Armstrong, and T. Bewley. May 1 1947. 629,637.

Production of selenomercaptans.—California Research Corporation. May 13 1946. 629,638.

Process for preparing high viscosity polyvinyl alcohol and the high polyvinyl alcohol resulting from said process.—Shawinigan Resins Corporation. Nov. 20 1946. 629,695.

Handling of carbonaceous solids.—Standard Oil Development Co. Nov. 22 1946. 629,696.

Methods of preparing dimethyl silicone gums.—British Thomson-Houston Co., Ltd. June 11 1946. 629,642, 629,486.

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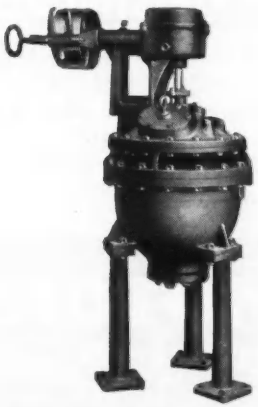

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